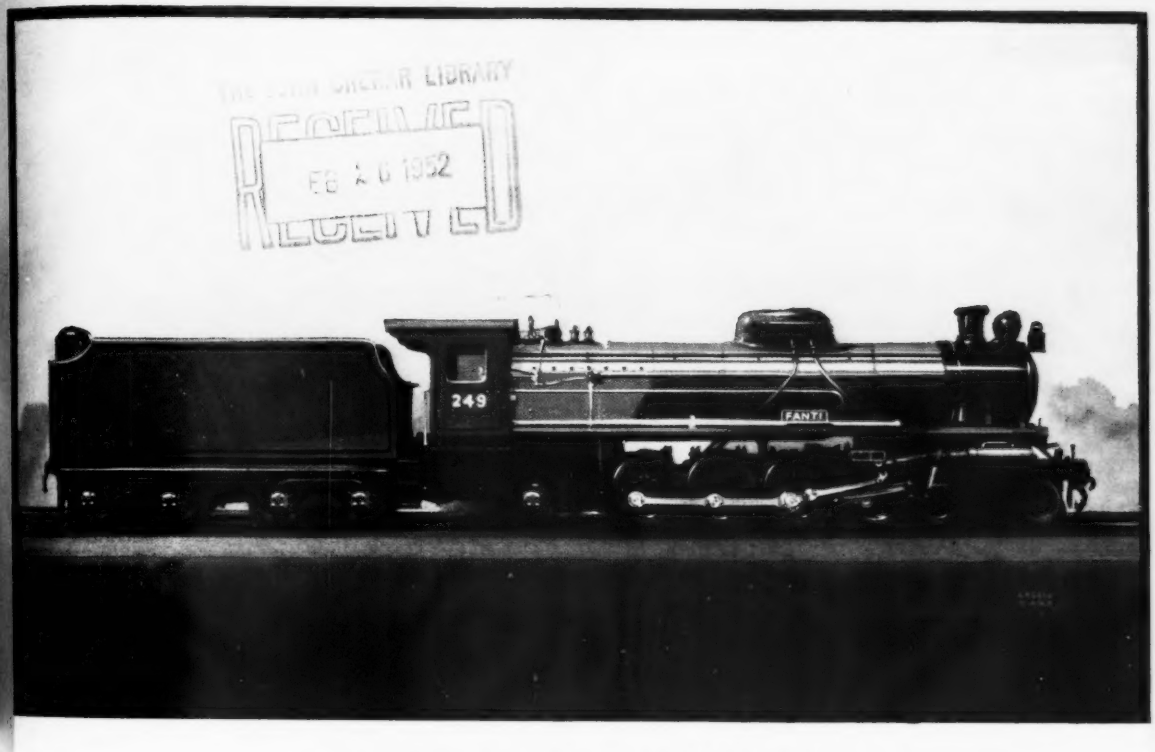
THE
RAILWAY GAZETTE

Price: Two Shillings | FRIDAY, FEBRUARY 8, 1952 | Annually £4-10-0 post free

THE SCIENCE MUSEUM LIBRARY
RECEIVED
FEB 20 1952



GOLD COAST RAILWAY

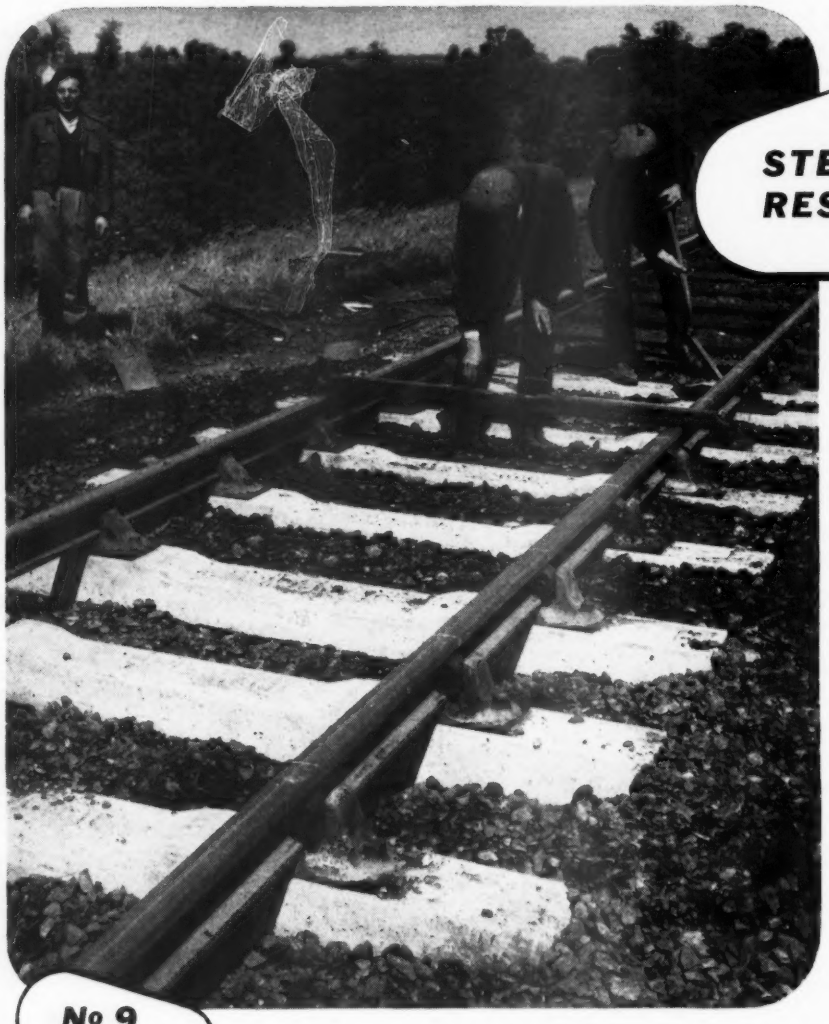
Thirty 4-8-2 locomotives, built by The Vulcan Foundry Ltd., have recently been placed in service on the Gold Coast Railway. These locomotives are equipped with Timken cannon boxes on the leading bogie, driving and coupled axles and with outside journal axleboxes on all other axles. All crank pins are equipped with Timken tapered-roller-bearing assemblies.

TIMKEN Regd. Trade Mark: TIMKEN

tapered-roller-bearing axle boxes

MADE IN ENGLAND

BRITISH TIMKEN LTD. BIRMINGHAM, AND DUSTON NORTHAMPTON



STEPS IN RESLEEPERING

A SERIES OF PICTURES

(Photograph by courtesy of British Railways)

№ 9

Showing the ganger checking the cross level.

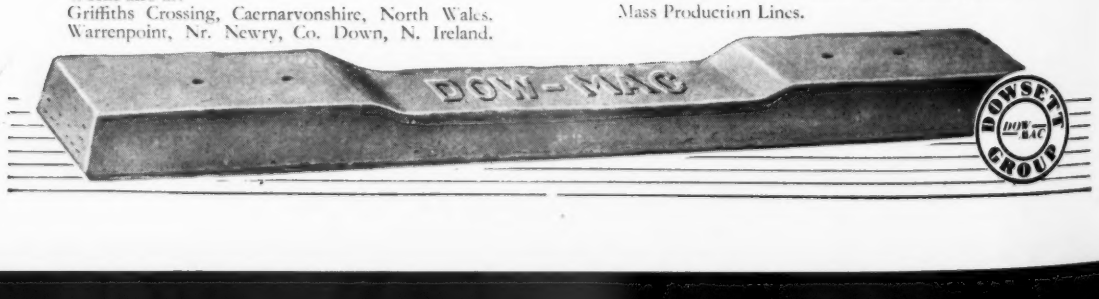
The Dow-Mac Patent Prestressing process gives the sleeper a permanent compressive stress to withstand the passage of heavy axle loads at high speeds. This exclusive feature added to rot-proof qualities, frost and termite resistance and uniformity of product makes for efficient operation under all running conditions.

DOW—MAC

PRESTRESSED CONCRETE SLEEPER

DOW-MAC (PRODUCTS) LTD
TALLINGTON, STAMFORD, LINCOLNSHIRE
Works also at:
Griffiths Crossing, Caernarvonshire, North Wales.
Warrenpoint, Nr. Newry, Co. Down, N. Ireland.

Makers also of Prestressed Concrete Bridge Beams, Fence Posts, Transmission Poles, Kerbs, Piles, Flooring, Decking and Pre-cast Units of all descriptions on Mass Production Lines.



..all cut by FIBREGLASS

1" DIAMETER pipes insulated with 'Fibreglass' rigid sections. One bound with wire netting and finished in hard-setting cement. One in hard-setting cement bound with wire netting and roofing felt and bitumen painted.

100 FEET of bare pipe of 3" bore carrying steam at 400° F will lose heat equivalent to 54 tons of coal per year.

YOU can save 50 tons of this by insulating the pipe with 'FIBREGLASS' RIGID SECTIONS 2" thick.*

COMPARE this with the thickness of other insulating materials you would have to use to achieve the same saving. You will find that with most of them you would need at least 3". That means more space, more weight on pipe supports, more finishing materials; in short higher overall installation cost — and higher costs for paint maintenance.

CLEARLY, when it's a matter of insulating, it pays on all counts to use 'Fibreglass'.

* *These figures assume :—*
1—a boiler-efficiency of 70%
2—a calorific value for coal of 10,000 B.Th.U/lb.
3—an operating time of 8,000 hours/year

FIBREGLASS
TRADE MARK

For structural, heat and cold insulation. Sound-deadening. Acoustic correction. Porous membranes for pipe wrapping, flooring, roofing. Battery retainers and air filters. In textile form for electrical insulation and flameproof decorative fabrics.

FIBREGLASS LIMITED, RAVENHEAD, ST. HELENS, LANCS. (ST. HELENS 4224). London Office : *63/65 Piccadilly, W.1 (Regent 2115/6).* **Glasgow Office :** *136 Renfield St. (Douglas 2687).* **Newcastle-on-Tyne Office :** *16 Dean St.* **Manchester Office :** *11 Piccadilly (Blackfriars 8863)* **Birmingham Office :** *Piccadilly Arcade, 105 New St. (Midland 0464/5).* **Dublin Office :** *21 Merrion Sq. North (Dublin 66024)*

RAILWAY AGENTS: W. Gilmour Smith & Co. Ltd., 136 Renfield Street, Glasgow

Machining castings up to 25 tons . . .

James Bridge Steel Works, Wednesbury, Staffs. Darlaston 225

It is a great advantage to the engineer if the foundry that produces his castings can also machine them. Steel castings delivered as machined units ready for assembly have obvious advantages over rough castings.

Part of Lloyd's foundry service is the machining of castings up to 25 tons. The super Twin Tyre Press and the Locomotive Frame Cradle illustrated are examples of Lloyd's machining resources.

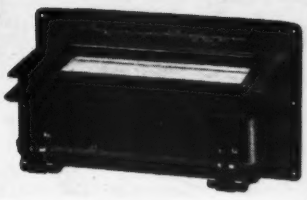
At Lloyd's every modern scientific device, combine, with three generations of foundry skill, to give you better steel castings. Flexibility in the variety of steel analysis, sensitive control of heat treatment, hydro blast cleaning plant, all contribute to Lloyd's unsurpassed foundry service.

. . . is part of Lloyd's Foundry service

F. H. LLOYD & CO. LTD.

Modern Developments

1



2

in

WESTINGHOUSE

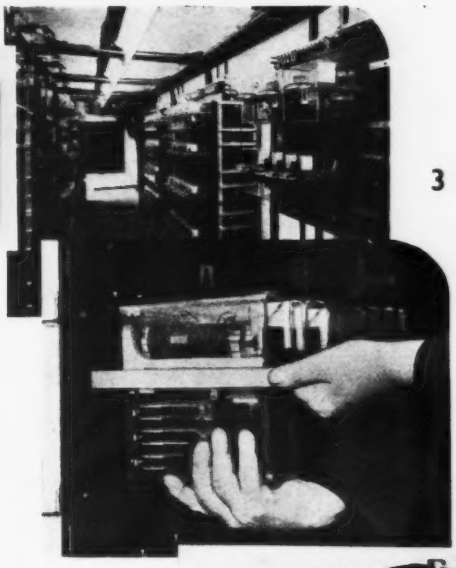
SIGNALLING

are being used extensively by Overseas Railways

For example

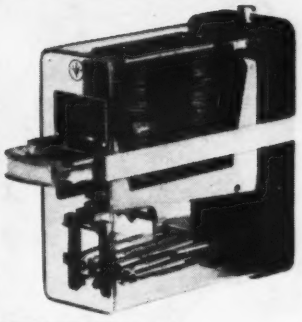
considerable stretches of line in New Zealand are operating on Westinghouse Centralised Traffic Control (**1** and **2**), which is also being manufactured for 100 miles of track in Western Australia.

Plug-in Relays (**3, 4** and **5**) in considerable quantities are in use or being made for many parts of the World, including the R.E.N.F.E. contract in Spain. Plug-in Relays of a different type form part of the Westinghouse Hump Yard Equipment (**6, 7** and **8**), a notable one recently supplied being for Prospect Yard, South African Railways.



3

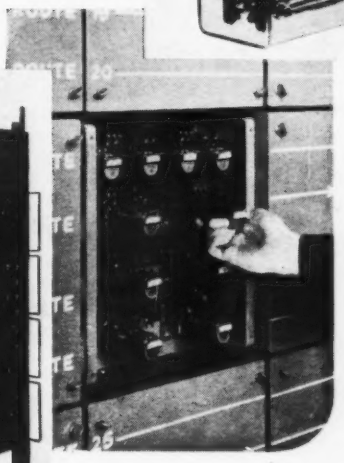
4

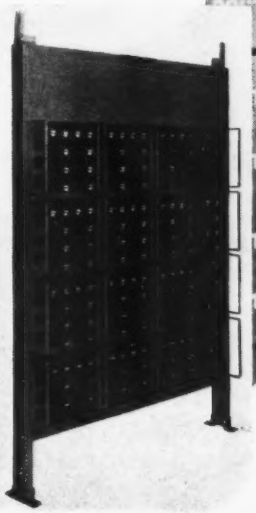


5

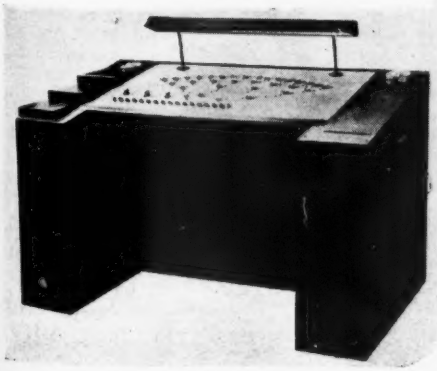
6

7





8

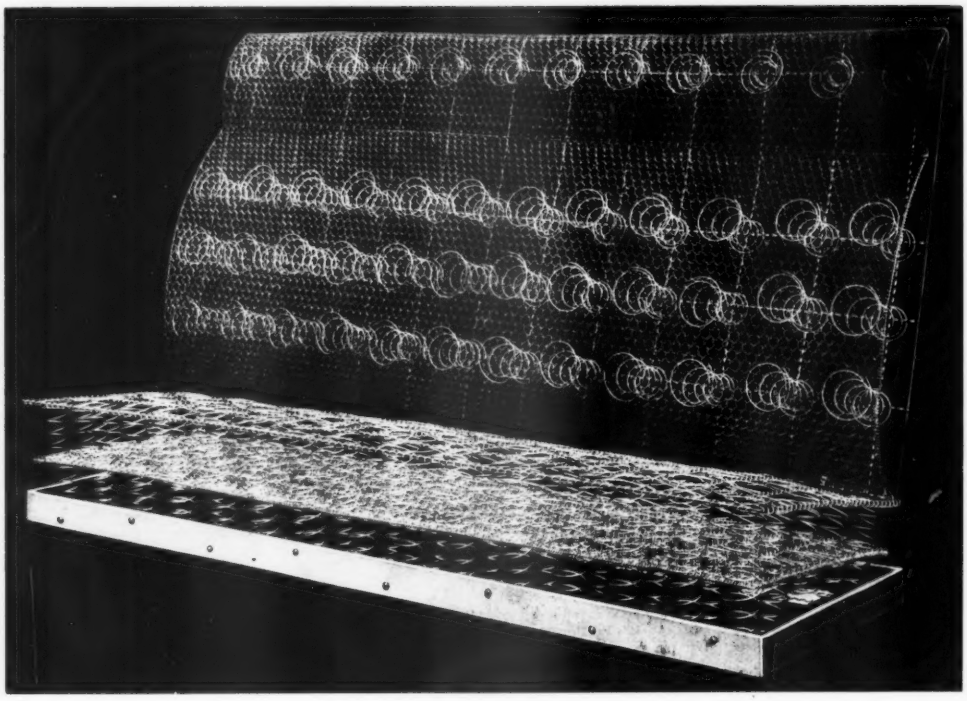


Westinghouse Brake & Signal Co. Ltd.
82 York Way, London, N.1

Represented in Australia by **McKenzie & Holland (Australia) Pty. Ltd., Melbourne**
Represented in India by **Saxby & Farmer (India) Ltd., Calcutta**

BUOYANT

Lace Web Seating



Code R.L. 8

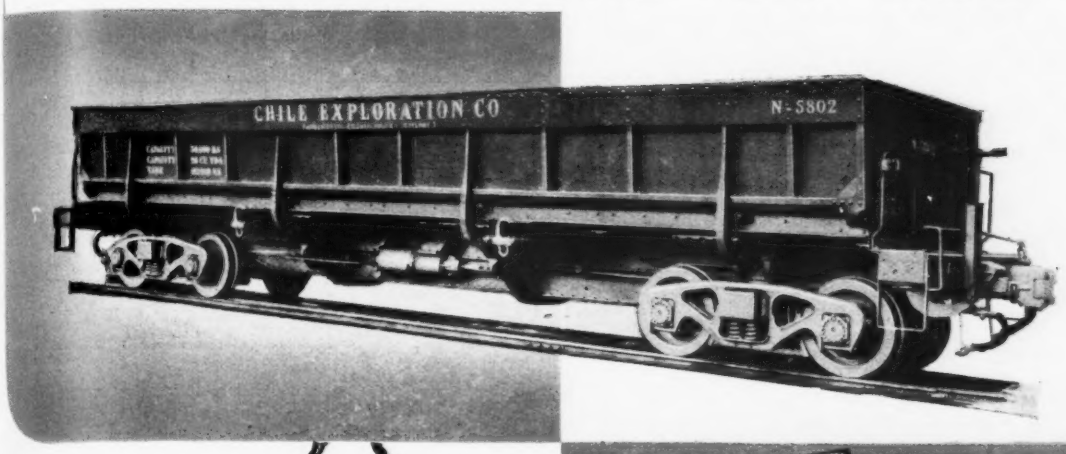
for Comfort
and
Durability

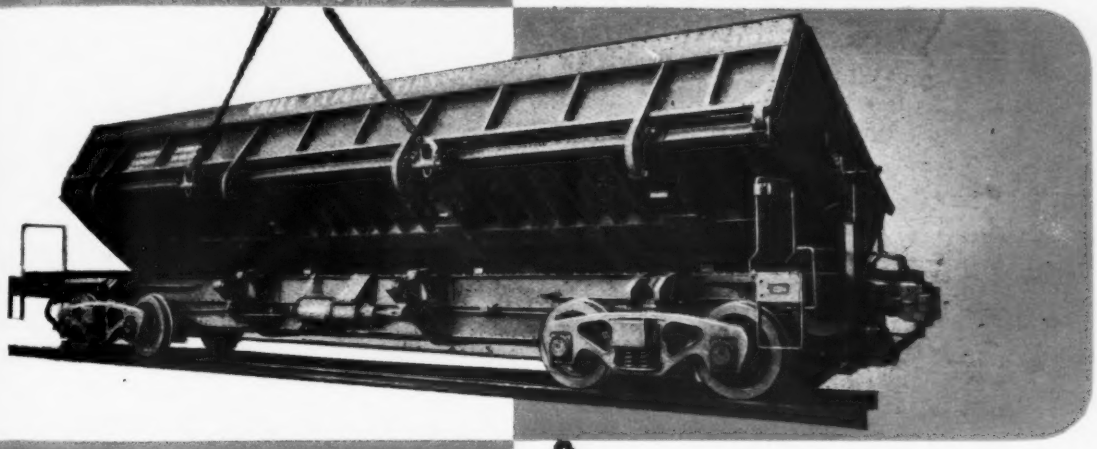
THE LACE WEB SPRING CO. LTD.

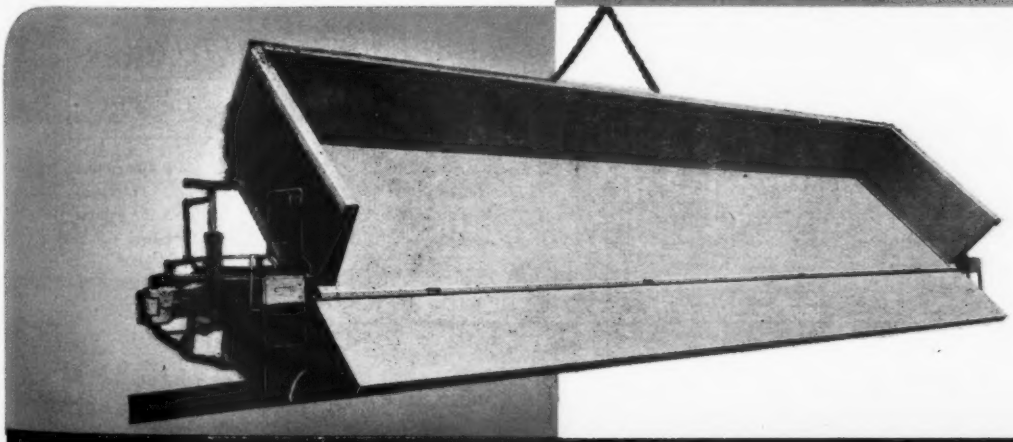
Sandiacre, Nottingham

Phone : Sandiacre 2133-4-5

GREGG CAR CO LTD







LONDON REPRESENTATIVES

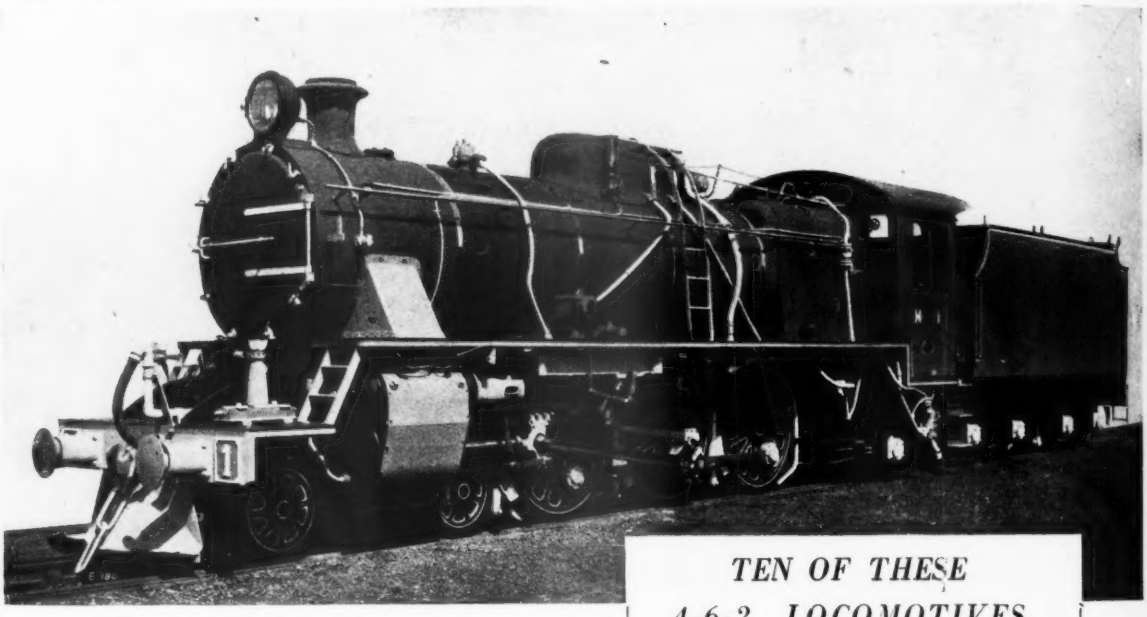
RMP
RAILWAY MINE & PLANTATION EQUIPMENT LTD

RAILWAY MINE & PLANTATION EQUIPMENT LTD.

IMPERIAL HOUSE · DOMINION STREET · LONDON E.C.2.

Telephone CLErkenwell 1777 (8 lines) · Grams Minplan Ave London, · Cables Minplan London

LOCOMOTIVES
FOR
Tasmanian Government Railways



Gauge		3′-6″	
Cylinders	16″ diameter × 24″ stroke		
Coupled Wheels	diameter 4′-7″		
Boiler Pressure	180 lb. per square inch		
Heating Surface	Flue tubes	371	square feet
	Boiler Tubes	601	,, ,,
	Arch Tubes	12·5	,, ,,
	Firebox	124	,, ,,
Evaporative Heating Surface		1108·5	,, ,,
Superheater Elements		265	,, ,,
Total Heating Surface		1373·5	,, ,,

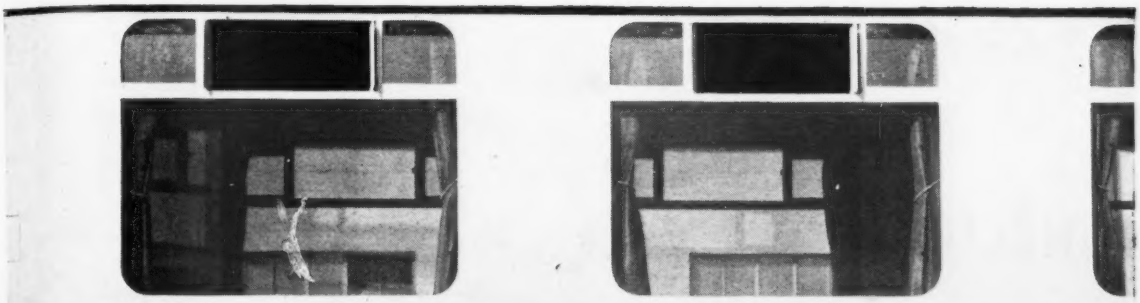
TEN OF THESE 4-6-2 LOCOMOTIVES HAVE BEEN BUILT FOR TASMANIA

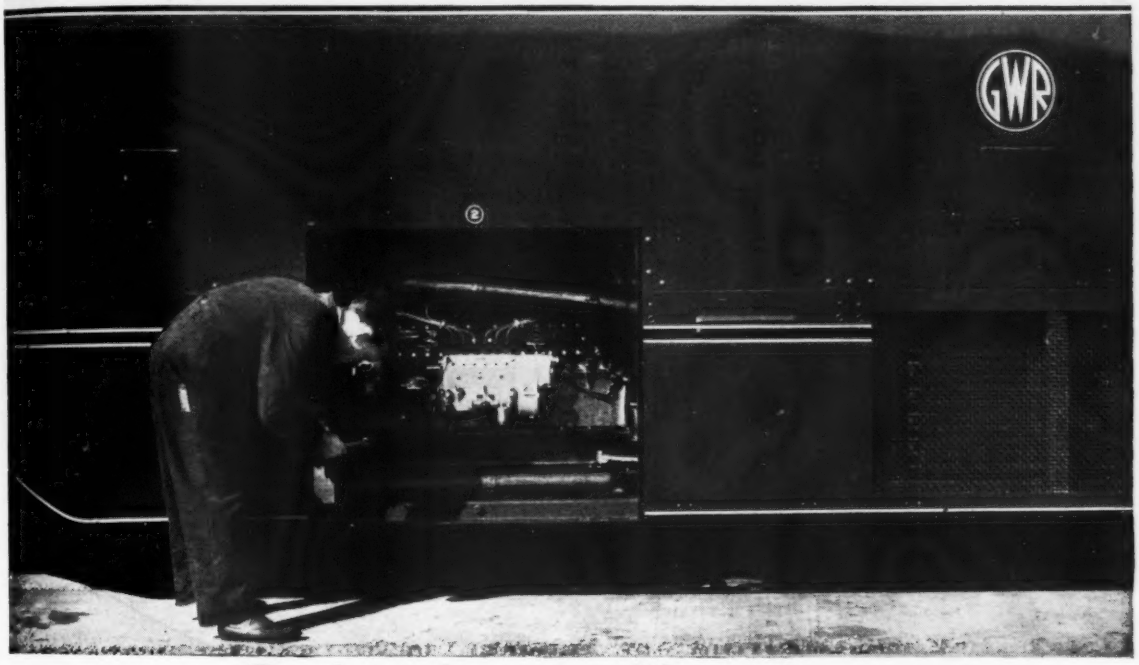
Grate Area	23·1 square feet
Tractive Effort at 85% Boiler Pressure	17,091 lb.
Tender Capacity	Water 3,562 gallons Fuel 6 tons

Roller bearings are fitted throughout.

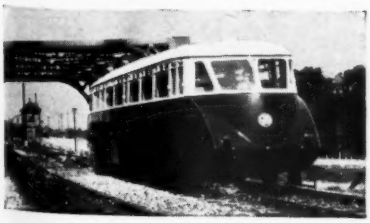
ROBERT STEPHENSON & HAWTHORNS
LIMITED
DARLINGTON AND NEWCASTLE
ENGLAND

A.E.C. DIESEL RAILCARS





Designed to simplify maintenance . . . proved over 15 million railcar miles



A High Speed Buffet Railcar

For over forty five years, the name of A.E.C. has been linked with public transport. During this time, it has been their policy to ensure that maintenance of their products was made as simple as possible, to reduce costs and mileage lost through lay-off. And for the past seventeen years this policy has also been applied to railcars where accessibility of units was one of the keynotes of the original design. Railway undertakings can rely upon A.E.C. Diesel Railcars for efficient main and branch line working.

A.E.C. Limited, Southall, Middlesex is a member of the Group of Companies controlled by Associated Commercial Vehicles, Ltd., of which the selling organisation is

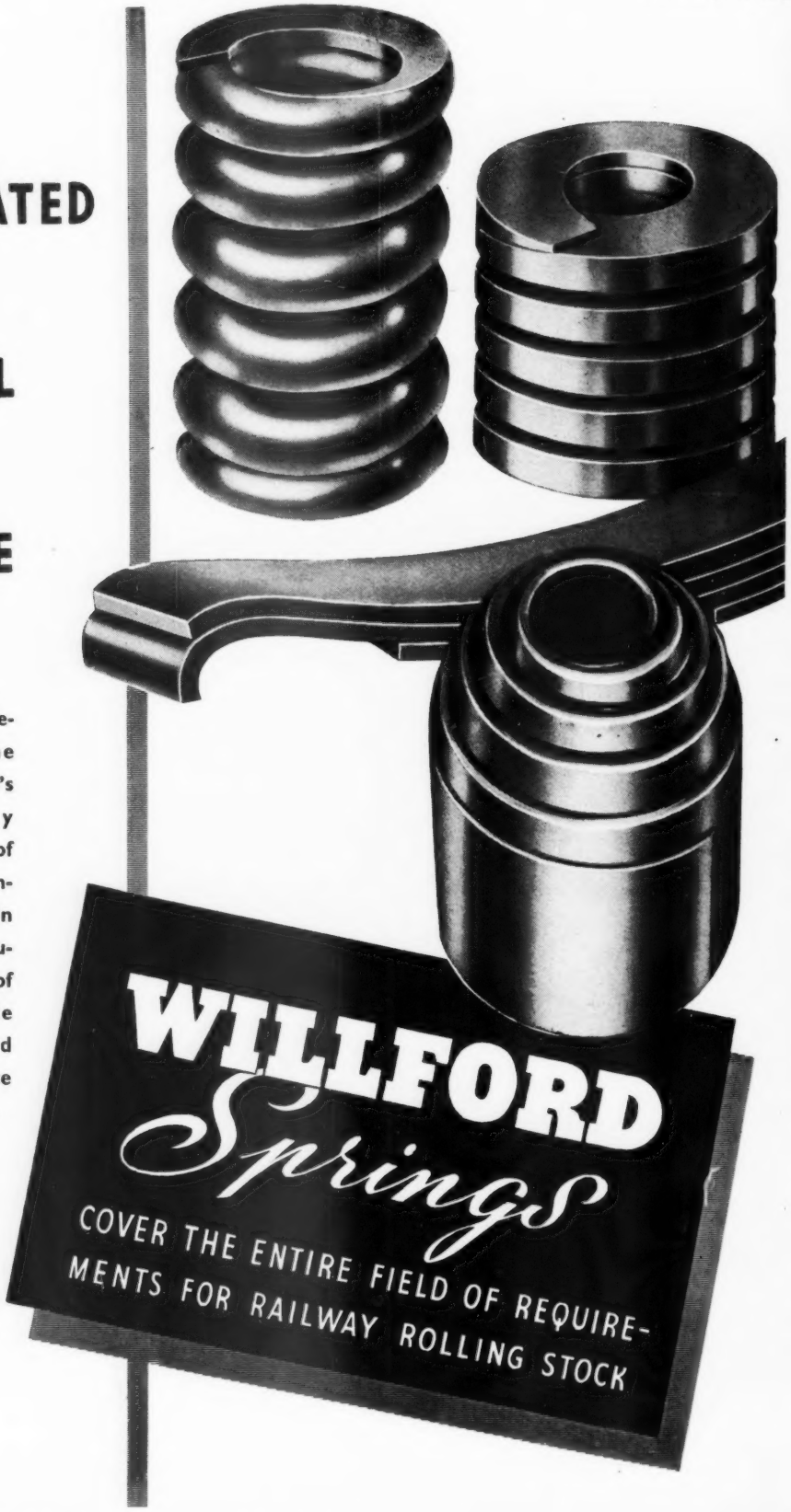
A.C.V. SALES LTD., 49 BERKELEY SQUARE, LONDON, W.1. Telephone: REGENT 2141

✱ LAMINATED

✱ HELICAL

✱ VOLUTE

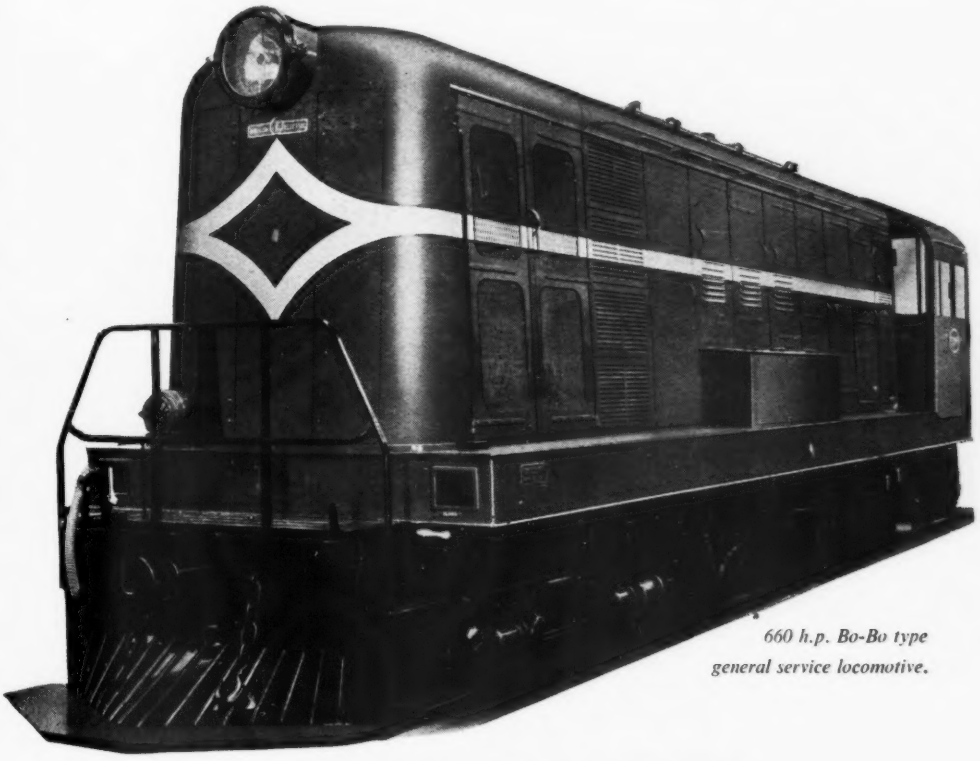
Proved for their dependability by the majority of the world's principal railway systems. Willfords of Sheffield can offer unrivalled experience in the design and manufacture of all types of springs. This wide knowledge is supported by the most up-to-date production facilities.



WILLFORD & COMPANY LTD. · PARK HOUSE WORKS · SHEFFIELD, 9

'ENGLISH ELECTRIC'

diesel-electric traction



660 h.p. Bo-Bo type general service locomotive.

Locomotives for New Zealand

Forty-six diesel-electric locomotives are being built for the New Zealand Government Railways by 'ENGLISH ELECTRIC', who have also supplied a large number of electric locomotives and multiple unit electric trains to New Zealand since 1921.

Fifteen 660 h.p. Bo-Bo type 'ENGLISH ELECTRIC' diesel-electric locomotives for general service are at present being put into traffic in New Zealand, and thirty-one 1,500 h.p. locomotives are being built for main-line work.

The ENGLISH ELECTRIC Company Limited

QUEENS HOUSE, KINGSWAY, LONDON, W.C.2

Traction Department, London

Works: STAFFORD · PRESTON · RUGBY · BRADFORD · LIVERPOOL

TNDE.7

This special weathering detail designed for the Margam Cold Strip Mill enabled panes of glass to be butted together without overlap in a neat and weatherproof joint. It enabled the Architect's "Cascade" effect to be successfully carried out.

WILLIAMS AND WILLIAMS at MARGAM

Further examples of the versatility of Aluminex Patent Glazing

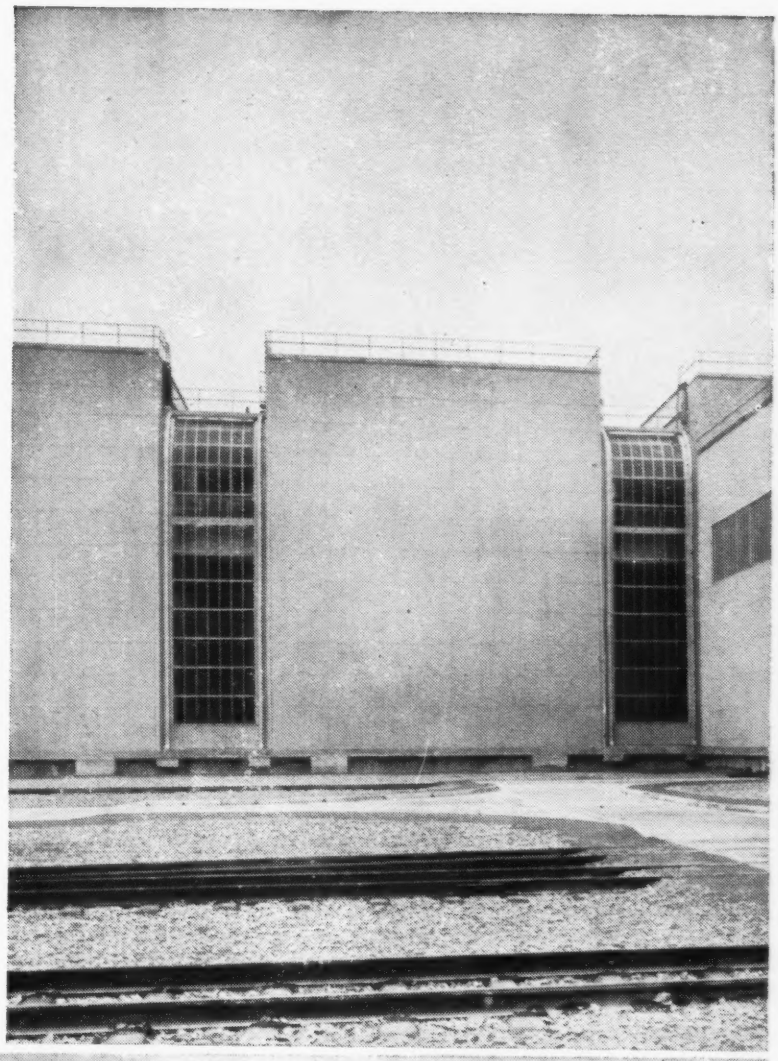
The Abbey Works of the Steel Company of Wales, is the largest rolling mill in Europe and is one of the most outstanding engineering plants designed since the war. Working in conjunction with the Consulting Engineers, Messrs. W. S. Atkins & Partners, and the Architects, Sir Percy Thomas & Sons, Williams and Williams were able to produce glazing of a unique and impressive character, examples of which are shown in these pages. The cascade sidewall lights are of particular interest, being expressly designed to meet the exacting lighting requirements.

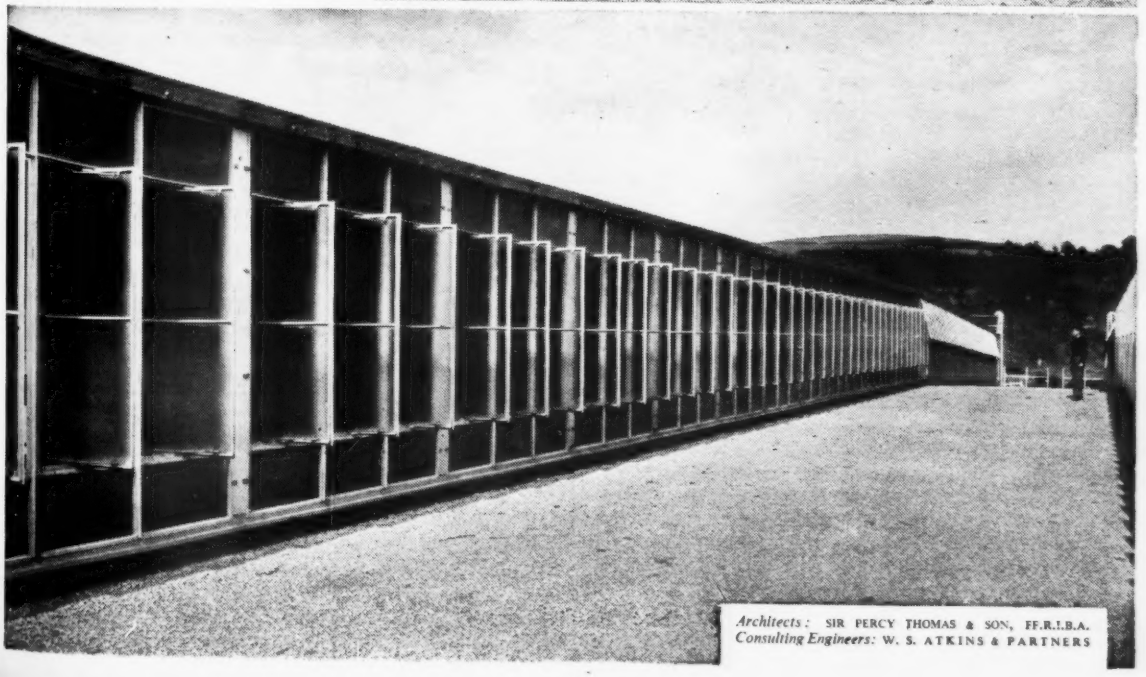
CASCADE GLAZING When it had been decided that Aluminex Patent Glazing provided all the features required for the sidewall glazing of the Steel Mills at Margam, certain technical difficulties were discovered. In order to produce even daylighting throughout the building it was necessary that the panels of sidewall glazing should curve inwards at the head. It was inadmissible to break the line of the curve by allowing the panes to overlap in a "lobster-back" fashion and curved glass was out of the question because of cost and difficulty of replacement. The effect had to be achieved by using flat panes of glass set out in a series of chords, and this arrangement presented special weathering problems, as also did the very flat pitch near the top of the cascade.

To overcome these the Aluminex engineers designed a new weathering detail which is shown in the drawing and in the photograph at the bottom of the opposite page, and is a development of the standard Aluminex "Z" weathering extrusion which is one of the special features of the Aluminex Glazing system. The remarkable effect achieved resembled cascades of glass and is vividly illustrated in the photographs. The cascades are each fourteen feet wide and range from fifteen feet to fifty-five feet high. The fifty-five foot cascades are composed of seven vertical tiers with a further curved portion of three tiers on a 9′ 9″ radius. The cascades were glazed in some instances with specially toughened glass in order to resist the thermal shock caused by hot ingots passing within a few feet of them.

HIGH/LOW ROOF CONSTRUCTION To provide controlled ventilation together with even distribution of light, the monitors in the Cold Mill Building are glazed partly with continuous top-hung Aluminex opening lights and partly with aluminium vertical pivot-hung windows made by the Reliance Division of Williams and Williams. Both are operated by Teleflex Gear with hand-operators placed so that they can be manipulated from walkways on the crane gantry. The vertical pivot-hung windows are arranged to open 135 degrees and are coupled together in ranges so that one gear operation opens the complete range. Thus ventilation can be controlled quickly to very fine degrees in accordance with either temperature or changes in wind direction.

Williams and Williams Ltd
Makers of Metal Windows, Doors and Aluminex Patent Glazing.
RELIANCE WORKS • CHESTER





Architects: SIR PERCY THOMAS & SON, FF.R.I.B.A.
Consulting Engineers: W. S. ATKINS & PARTNERS

METCALFE'S

MONITOR

LOCOMOTIVE LIVE STEAM INJECTORS

METCALFE'S PATENT 'TYPE M'

2-6-0 Tender Engine fitted with two Monitor Live Steam Injectors: *photo by courtesy of British Railways*

ADAPTATION OF THE TYPE "M" INJECTOR.

Monitor Injectors can be supplied to interchange with any flange connection required. The cone system can be adapted to suit existing injector bodies; this has been done with success in many instances.

Monitor Injectors are outstanding for their performance and reliable trouble-free service under all Locomotive operating conditions, and represent the latest practice in Locomotive Live Steam Injector design.

RELIABILITY OF MONITOR TYPE INJECTORS.

The type "M" Cone system is exceptionally powerful under all operating conditions, thus ensuring the maximum reliability even under the most difficult conditions. The wide range of Steam pressures at which the Injector will operate ensures trouble-free service.

TYPE "M" CONE SYSTEM.

This consists of the double Steam Cone in conjunction with the Gap type combining cone which embodies the patent renewable end. There are no moving or sliding parts. The Cones screw together to form two units:—

(1) The Steam Cone.
(2) The Combining and Delivery Cone.

This cone system ensures reliability and low maintenance cost.

DAVIES & METCALFE LTD

INJECTOR WORKS · ROMILEY · MANCHESTER

Telegrams: EXHAUST, ROMILEY Telephone: WOOdley 2626 (2 Lines)

"Let's ask Dockers" ★

Is it a fungus? A mildew? A mould? A porous surface? An efflorescence? Does it require burning off, scraping, washing, rubbing down? Does it call for a Paint Remover, a Petrifying Liquid, a Primer? How many coats of Undercoating should be applied? Which finish will give the best effect? What maintenance schedule is indicated? Whatever the nature of the surface or the conditions which it has to endure, Dockers' Advisory Service are always prepared to investigate a problem and to recommend an effective treatment.

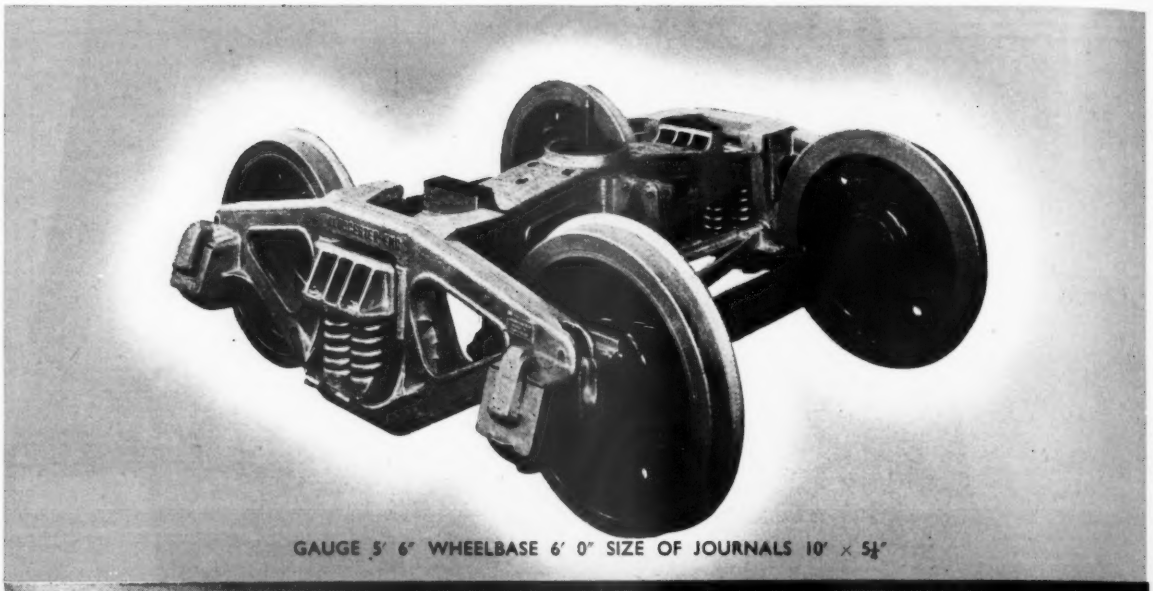
SYNTHOLUX Chromated Primer is suitable for application on ALL types of Aluminium Alloys, including high-tensile qualities.

DOCKER BROTHERS

Makers of Paints, Lacquers and Varnishes for every purpose

LADYWOOD BIRMINGHAM 16

★ *Yes, you are looking at cigarettes*



GAUGE 5' 6" WHEELBASE 6' 0" SIZE OF JOURNALS 10" × 5½"

Gloucester Bogies complete in every respect and fitted with either plain or roller bearing axleboxes can be designed by us and built to suit any gauge or axle loading requirements. High speed designs with long travel springs and constant friction or hydraulic damping devices are offered. Centre pressure type axlebox lids of various designs are available.

The salient features of these bogies are:

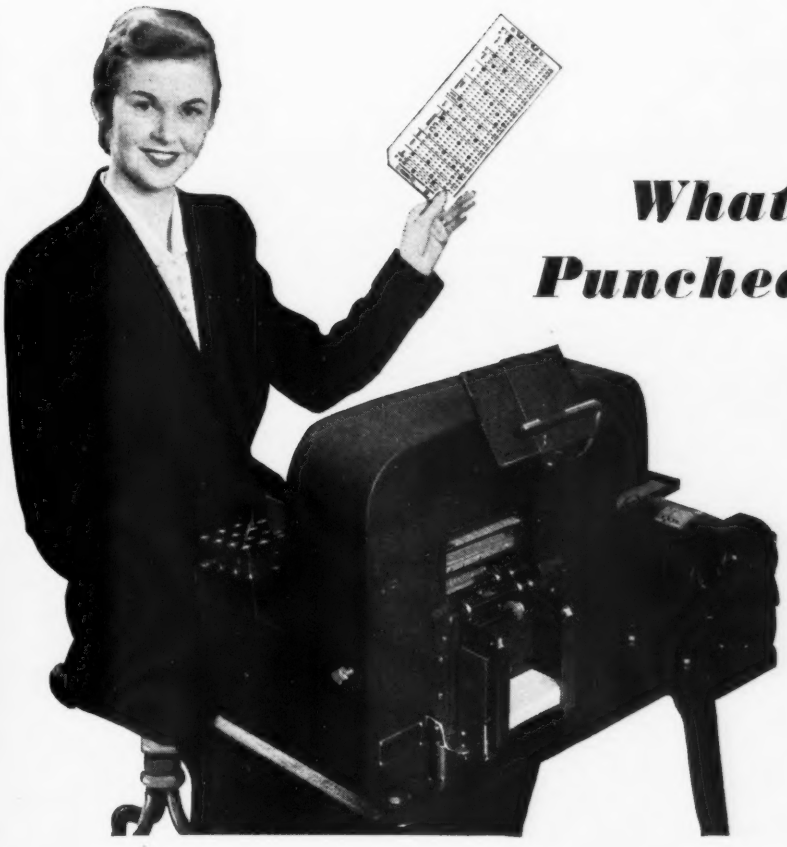
(1) Of three piece cast steel construction, easily assembled.
(2) Axlebox accurately machined to ensure interchangeability of side frames.
(3) Bolster spring unit arranged to facilitate installation and examination.
(4) Side or centre loaded bolsters.
(5) Arcuate bolster guides of special design.
(6) Maximum freedom of side frames for wheel drop.
(7) Self-lubricating centre and side bearers.

GLOUCESTER RAILWAY CARRIAGE AND WAGON CO. LTD.

TELEPHONE: 22111 (5 Lines) **TELEGRAMS: RAILCAR GLOUCESTER**

LONDON OFFICE: Albermarle House, Albermarle Street, Piccadilly, W.1. Phone: GROsvenor 8206

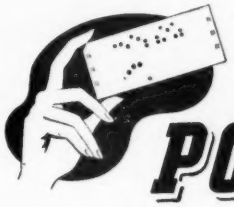
LET'S BE PRACTICAL — No. 1



What is a Punched Card?

A punched card is, of course, a card with perforations in it. But a Powers-Samas punched card is very much more than that. It is firstly a record — rapidly created and verified — and secondly the medium by means of which high speed accounting machines are activated.

Powers-Samas cards are of standard size and shape, and information is recorded in them by means of holes punched in pre-determined positions, each of which has an alphabetical or numerical significance. After they are punched and verified the cards are made to operate high speed sorting and tabulating machines which mechanically sense and analyse the perforations and re-translate them into printed words and figures in any desired accounting or costing format. At the same time quantities and amounts are automatically accumulated and totals are printed as required.



POWERS-SAMAS

POWERS-SAMAS ACCOUNTING MACHINES (SALES) LIMITED
POWERS-SAMAS HOUSE · HOLBORN BARS · LONDON, E.C.1
Telephone No. HOLborn 8712

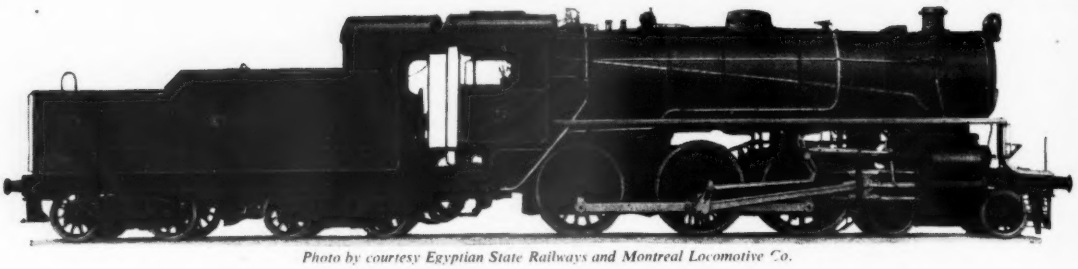


Photo by courtesy Egyptian State Railways and Montreal Locomotive Co.

vacuum brake ejector capacity

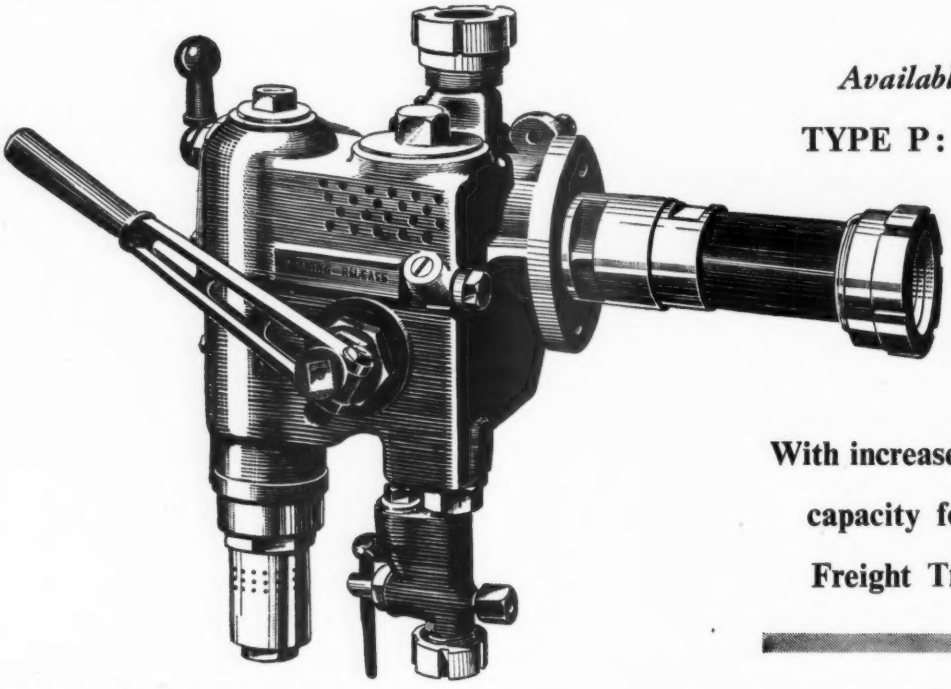
must match

locomotive

haulage

CAPACITY

GRESHAM'S S.J. Ejector



Available in two types:

TYPE P: For passenger and general purpose locomotives

TYPE G: With increased maintenance capacity for the heaviest Freight Train Operation

Write for descriptive literature:

THE VACUUM BRAKE CO LTD

Telephone: Abbey 5493 Telegrams: Solution Sowest, London

137, ABBEY HOUSE, WESTMINSTER, LONDON, S.W.1

Telephone: DEAnsgate 6061-4

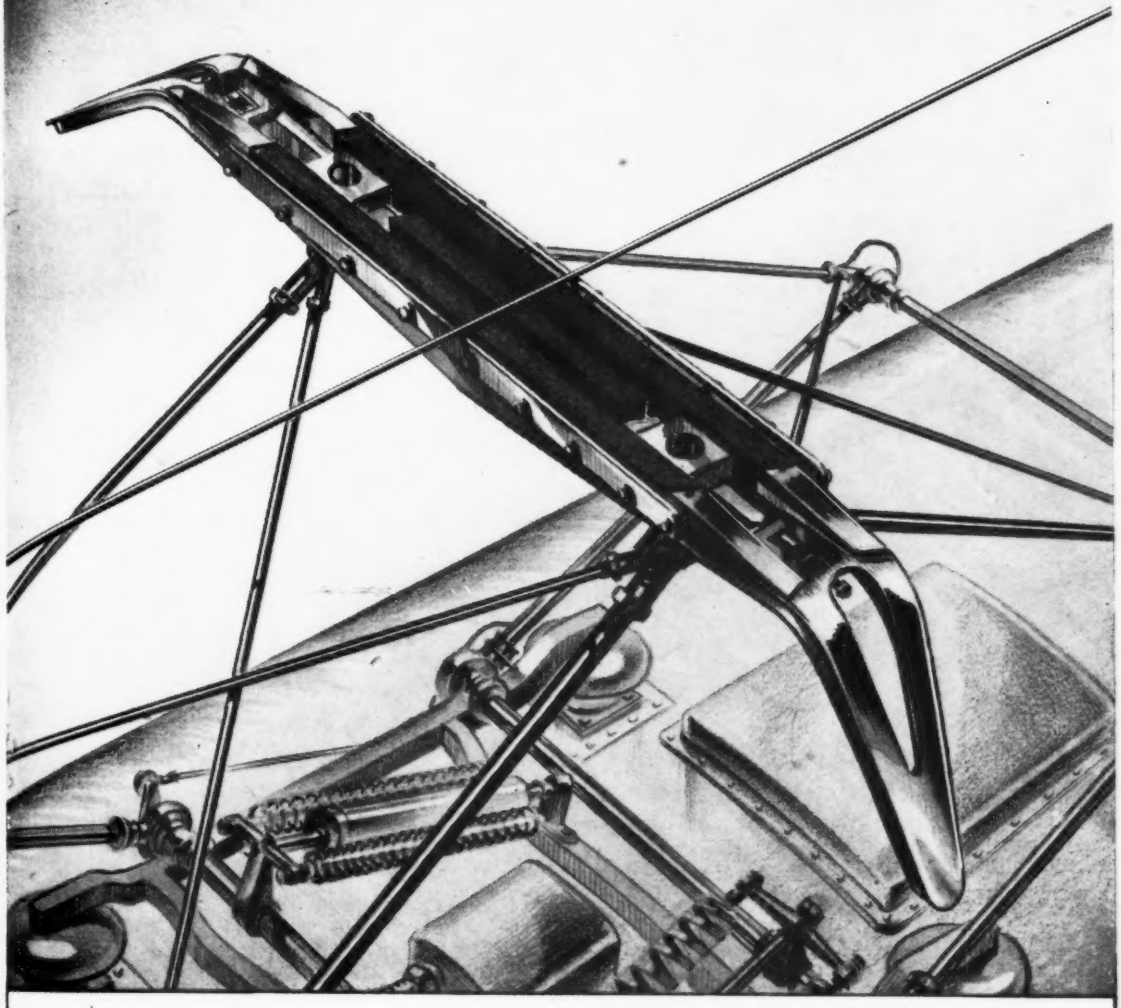
GRESHAM & CRAVEN LTD

ORDSALL LANE SALFORD · MANCHESTER 5

ENGINEERS

Telegrams: Brake Phone, Manchester

For High Speed & Long Life + + +



MORGANITE CARBON
PANTOGRAPH STRIPS

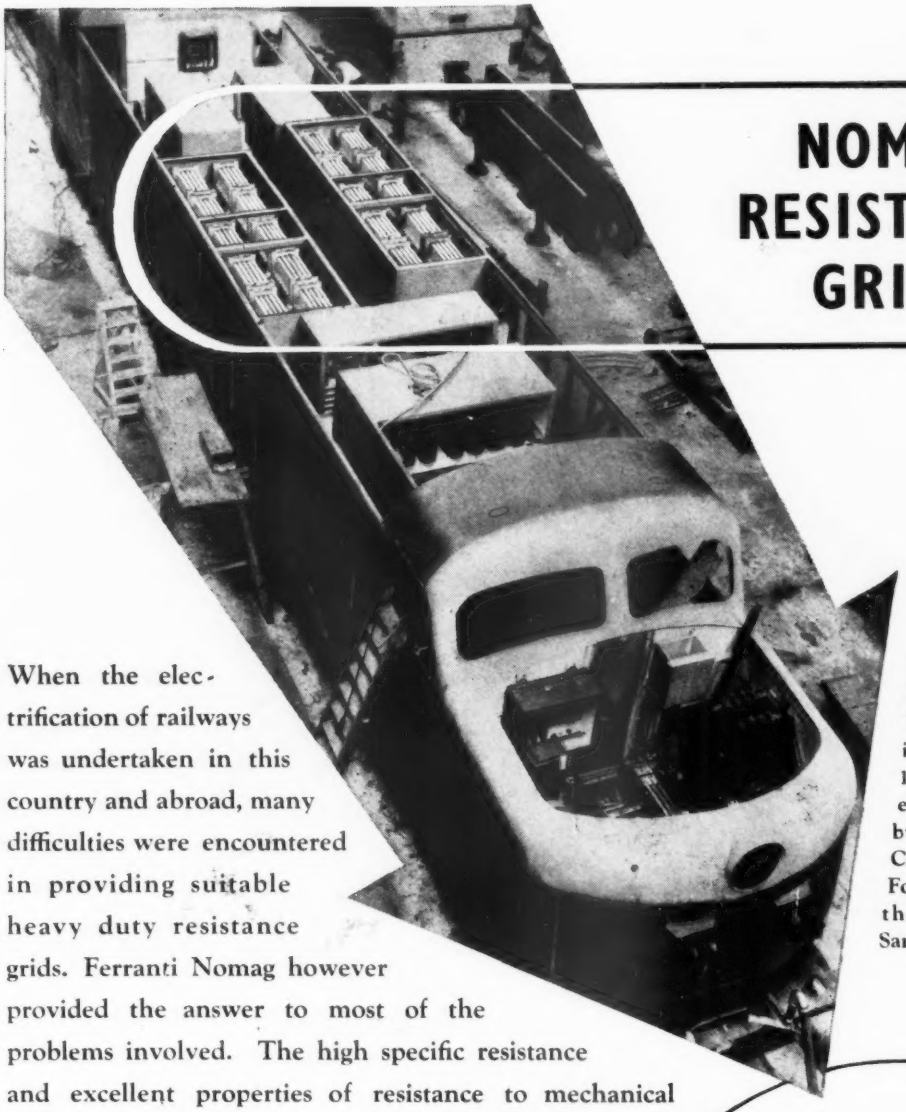
ARE USED ON THE CONTINENTAL STATE RAILWAYS INCLUDING THE DUTCH, FRENCH, DANISH & BELGIAN

REGISTERED TRADE MARK

THE MORGAN CRUCIBLE CO. LTD · BATTERSEA CHURCH RD · BATTERSEA · LONDON. S.W.11.

TELEPHONE: BATTERSEA 8822 · TELEGRAMS: CRUCIBLE. SOUPHONE LONDON.

C.10



NOMAG RESISTANCE GRIDS

When the electrification of railways was undertaken in this country and abroad, many difficulties were encountered in providing suitable heavy duty resistance grids. Ferranti Nomag however provided the answer to most of the problems involved. The high specific resistance and excellent properties of resistance to mechanical and thermal shock prompted the English Electric Co. Ltd. to specify Ferranti Nomag resistances for the locomotive illustrated.

This illustration shows banks of Ferranti Nomag resistance grids installed in one of the 15-3,000 H.P. 3,000 volt electric locomotives built by the English Electric Co. Ltd. and the Vulcan Foundry Ltd., for use on the Estrada de Ferro Santo a Jundiai, Brazil.

FERRANTI NOMAG

Non-Magnetic CASTINGS

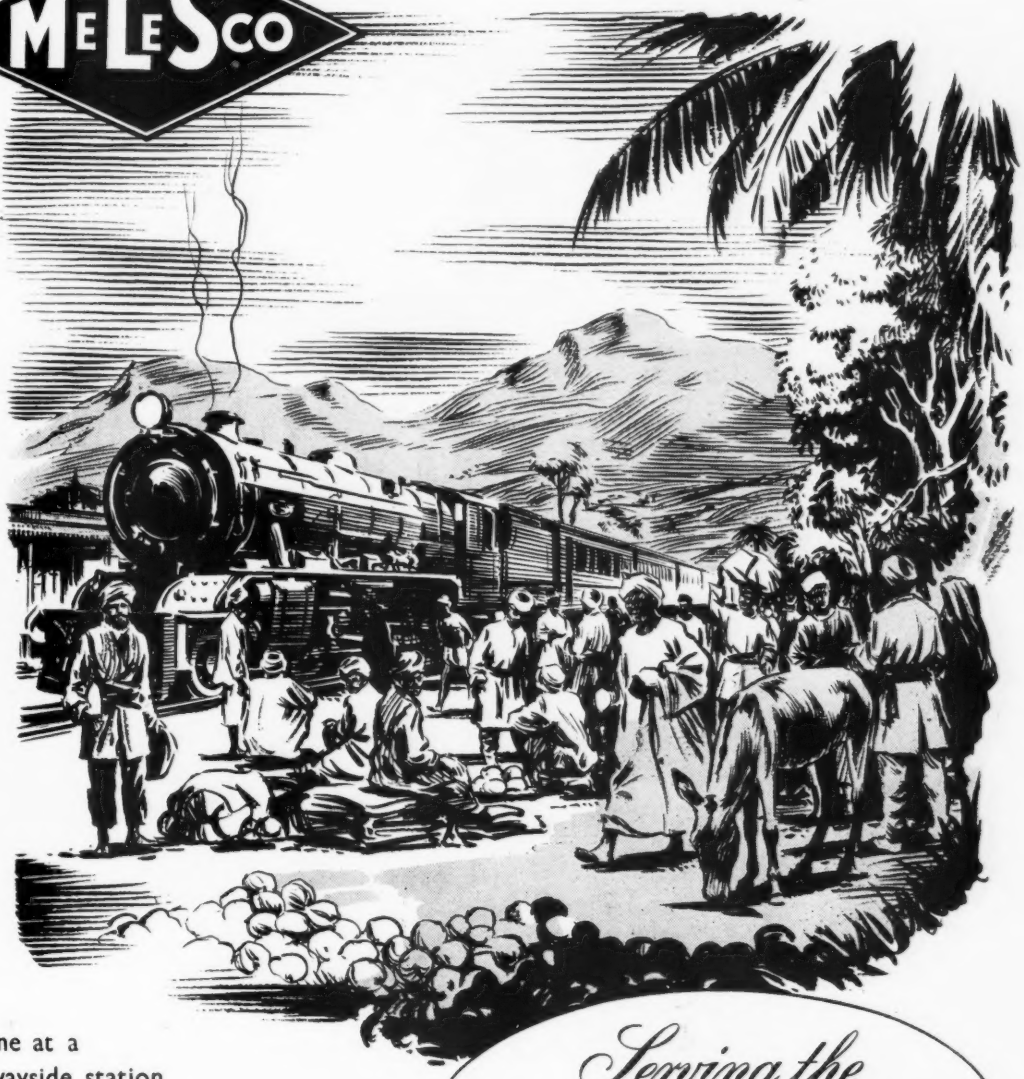
High Specific Resistance	150 micro-ohms per Cm^2
Low Resistance Temperature Co-efficient	·00045 per °C.
Physical Toughness (Izod Value)	29 ft. lbs.
MAX. Magnetic Permeability	1·03 lines/Cm^2

Good Machining Properties.

FA3

FERRANTI LTD., HOLLINWOOD, LANCS. London Office: Kern House, Kingsway, W.C.2.

MELESCO



Scene at a wayside station

Serving the Railways of the East

The **SUPERHEATER** *Company Ltd*

the authority on Superheated Steam

53 HAYMARKET, LONDON, S.W.1

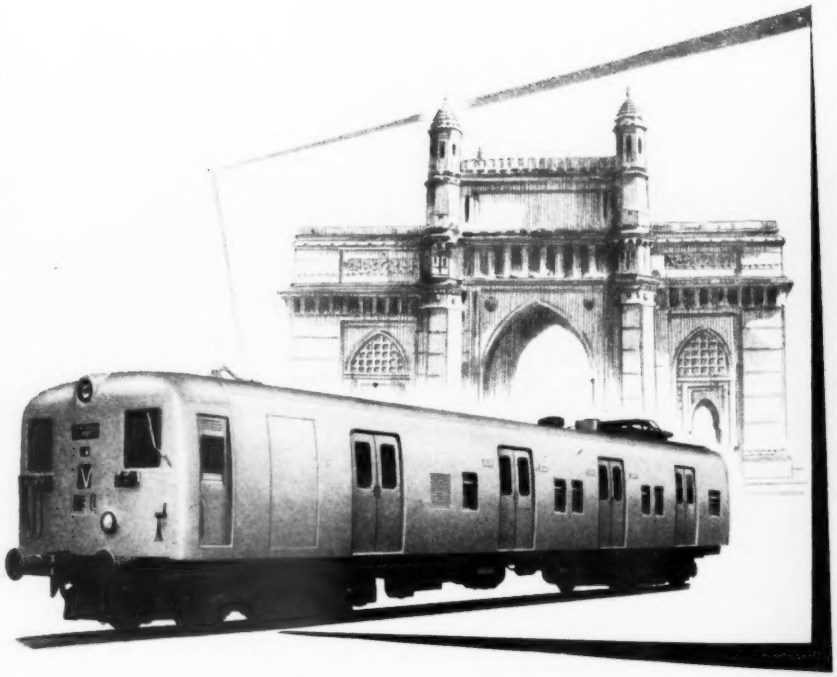
Works: TRAFFORD PARK, MANCHESTER, 17

BA.61

METRO-CAMMELL

A Symbol of Service on the Railways of the World

Rolling Stock in INDIA



INDIAN GOVERNMENT RAILWAYS

Third Class Steel Motor Coach of special lightweight construction.

One of 56 now being supplied for the Electrified Services of the **BOMBAY BARODA AND CENTRAL INDIA and GREAT INDIAN PENINSULA RAILWAYS.**

METROPOLITAN-CAMMELL CARRIAGE & WAGON CO. LTD.

Head Office: SALTLEY, BIRMINGHAM, 8. London Office: VICKERS HOUSE, BROADWAY, WESTMINSTER, S.W.1.

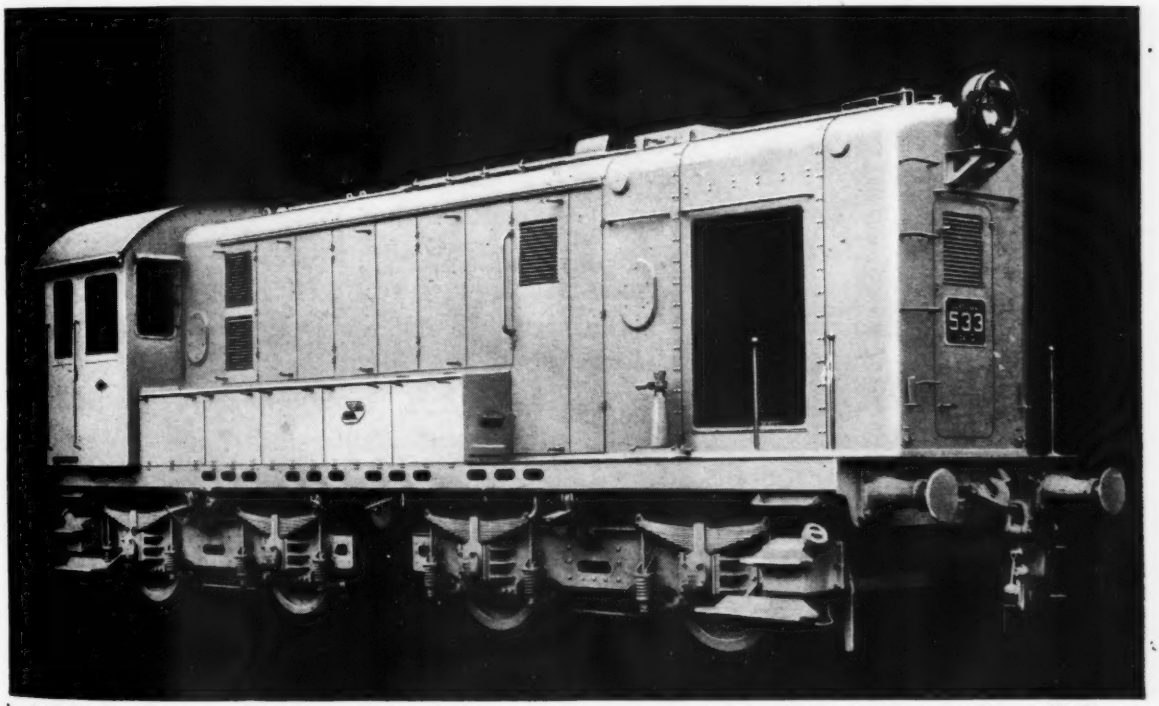
NORTH BRITISH LOCOMOTIVE COMPANY LTD GLASGOW

Behind each North British Locomotive stands the experience, progress and tradition of almost 120 years.

Over 27,000 North British Locomotives have been supplied to the principal Railways of the World.

We are justly proud of our achievements.

A 625 h.p. Diesel Electric Locomotive built in conjunction with The General Electric Co. Ltd. of England for Ceylon Government Railways. Gauge 5'6"



NORTH BRITISH LOCOMOTIVE CO. LTD.

GLASGOW SCOTLAND

PROTECTING THE GEARS

Photograph: British Railways

The Traction Gears fitted to the British Railways North Tyneside Electric Coaching Stock illustrated above have been lubricated with Caltex Crater Compound since 1937.
Caltex Crater Compound is the preferred lubricant for Traction Gears because of guaranteed protection to gear teeth.
Revenue mileage without shut down for repairs is assured when Caltex Crater Compound is employed.
There is a grade of Caltex Crater to suit all conditions.
Call for a Regent Engineer to discuss the grades most appropriate to your needs.

CALTEX CRATER COMPOUNDS

REGENT

Other Products:- Petrol, Vaporising Oil, Engine & Gear Oils, Chassis Lubricants, Grease & Rust-proofing Compounds

CALTEX

REGENT OIL COMPANY LTD., 117, PARK STREET, LONDON, W.1

B
T-H

TRACTION EQUIPMENT
—always ready for service

On the Bombay Baroda and Central India Railway, suburban traffic is heavy and the heat sometimes extreme, but the BTH-equipped electric trains maintain their frequent and punctual service without a hitch.

Whether for multiple-unit trains or for locomotives (electric or diesel-electric), BTH electric equipment provides the finest guarantee of instant readiness for service under all conditions.

THE
BRITISH THOMSON-HOUSTON
COMPANY LIMITED · RUGBY · ENGLAND

Member of the AEI group of companies

A4237

Not all Bogies have wheels

Take for instance the ever-present "bogies" of higher maintenance costs, shortage of manpower and the price of lubricants! These are problems that Tecalemit have solved. They can solve them for you and their experience and advice is freely at your disposal.

TECALEMIT
The Authority on Lubrication
PLYMOUTH & BRENTFORD

T.366

SO ADAPTABLE

it is attractive in appearance

SO UP-TO-DATE

it is ideal for booking halls and waiting rooms

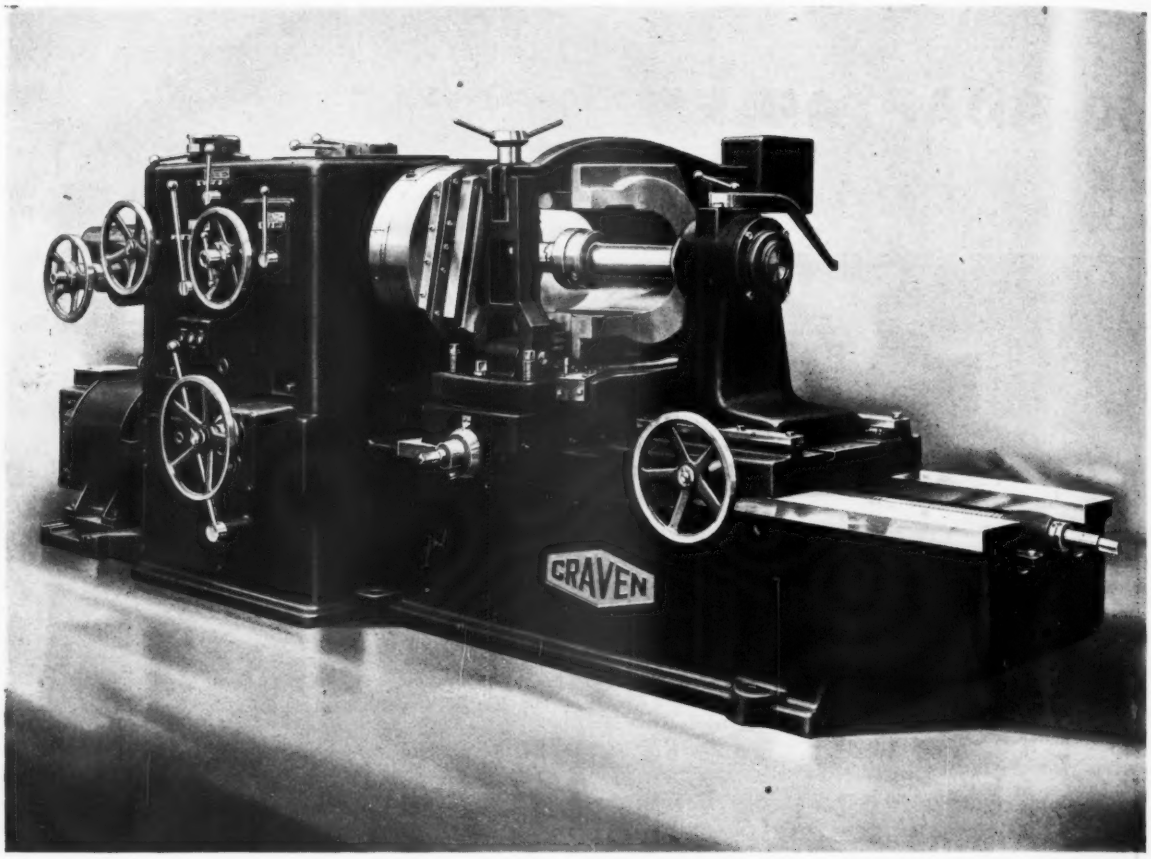
The most beautiful and modern lighting effects can be created with Osram cold cathode fluorescent lamps. Where outstanding efficiency is essential, where sheer beauty of lighting is an asset — Osram is the ideal choice — the modern system for modern needs.

Osram fluorescent lamps and G.E.C. fittings are available in wide variety to suit individual requirements.

Osram

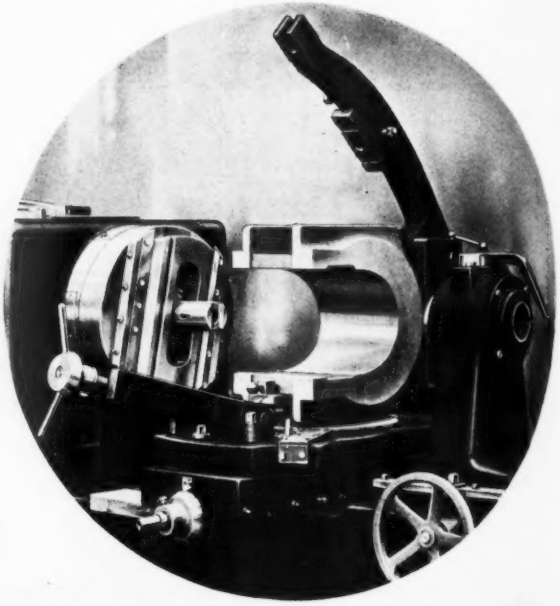
FLUORESCENT LIGHTING with G.E.C. fittings

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2



The "Craven" Single Ended
Axle Box Boring and Facing Machine

CRAVEN



The machine is arranged to bore and face one side of the locomotive axle-box at a single setting, after which the work is rotated on a revolving fixture for machining on the opposite face. A maximum diameter of 24" can be faced, and bores can be machined from $4\frac{3}{8}$" to $11\frac{1}{2}$" diameter. Boring and facing can be carried out simultaneously for roughing operations, or separately for finishing cuts.

CRAVEN BROTHERS
(MANCHESTER) LTD

VAUXHALL WORKS · REDDISH · STOCKPORT · ENGLAND.

'Tanalith' is a standard preservative for sleepers

'Tanalised' SLEEPERS

Vacuum and pressure impregnation with 'Wolman' 'Tanalith' is used as a standard treatment for sleepers by many of the World's railways. Not only British Railways, but also State Railways in Argentina, Rumania, Hungary, Germany and Persia as well as many private companies use 'Tanalised' sleepers for new track laying and maintenance work. The cleanliness of the treatment coupled with its high toxicity to fungi and insects commends it to permanent way engineers. It is estimated that since the 1939-45 war, some 4,040,000 sleepers and crossing timbers have been preserved with 'Tanalith.'

'Tanalith' is to timber, what paint is to steel

HTI

Sales and Treatment in the United Kingdom

HICKSON'S TIMBER IMPREGNATION CO. (G.B.) LTD.

Members of the British Wood Preserving Association

Head Office: Castleford, Yorkshire. Castleford 2607.9

London Office: 36 Victoria Street ABBey 1477/8.

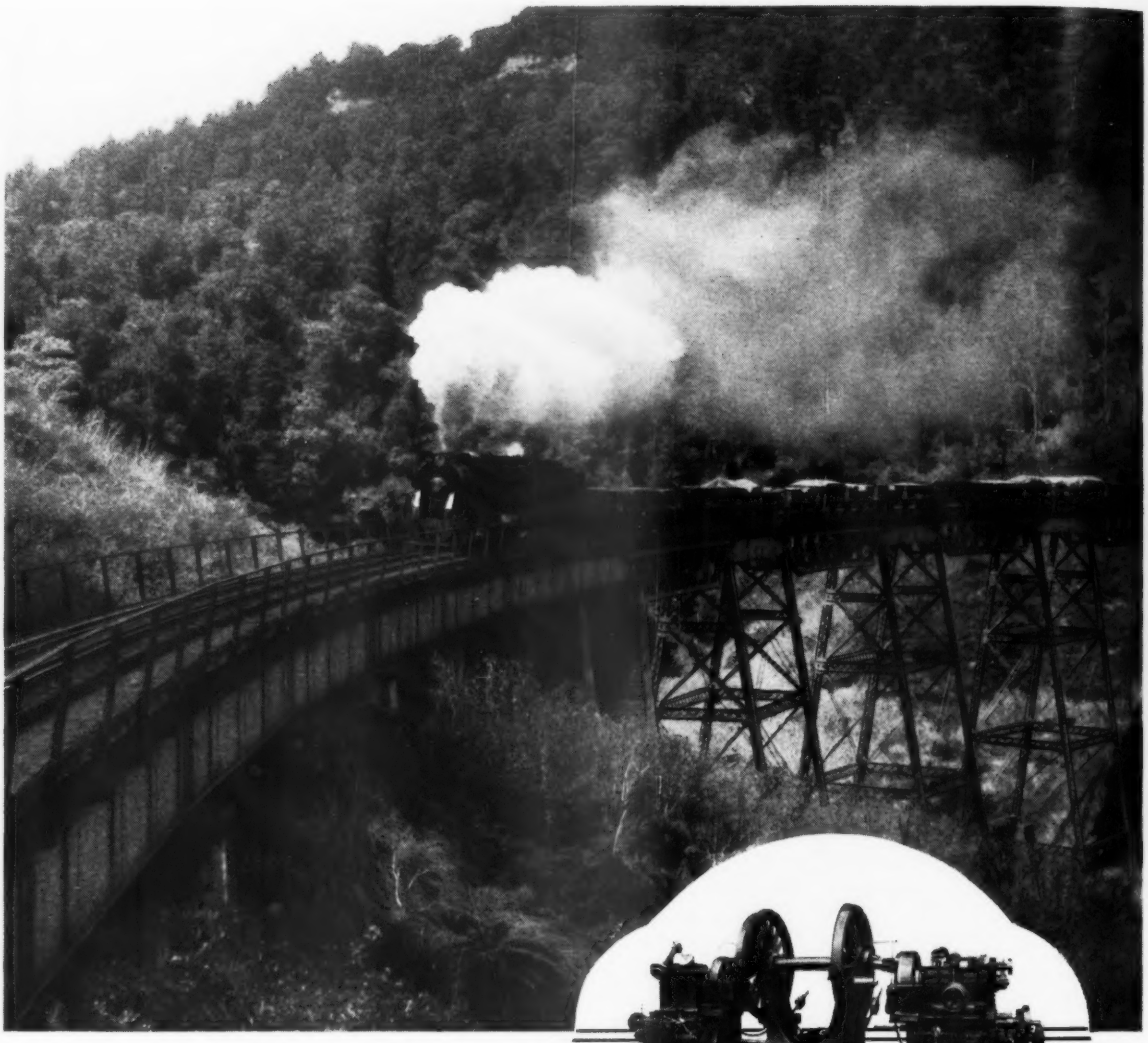
Sales and treatment in the Commonwealth and abroad

HICKSON & WELCH LTD.,
Castleford, Yorkshire

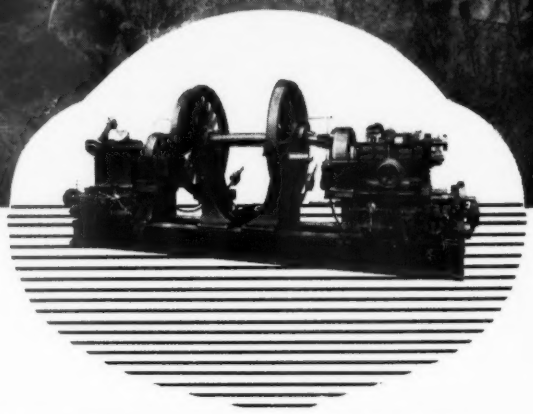
HW

HICKSON'S TIMBER IMPREGNATION CO. (S.A.) LTD.
Johannesburg.

HICKSON'S TIMBER IMPREGNATION CO. (N.Z.) LTD.
Auckland



Photograph by kind permission of NEW ZEALAND GOVERNMENT RAILWAYS



Churchill

The production and maintenance efficiency and the sweetness of running, both of locomotives and rolling stock, obtainable by a full use of Precision Grinding Machines are a revelation to those more accustomed to older methods of finishing by machining.

THE CHURCHILL MACHINE TOOL COMPANY LIMITED · BROADHEATH · NEAR MANCHESTER

Export Sales Organization:
Associated British Machine Tool Makers Ltd.
London, Branches and Agents.

Home Selling Agents:
Charles Churchill & Co. Ltd.
Birmingham, and Branches.

Axle Journal Re-grinding Machines

C605

PORTION OF LAYOUT FOR

LLANDUDNO JUNCTION

manufactured by us and delivered in seven sections

(Photograph by courtesy of British Railways)

TAYLOR BROS. (Sandiacre) LTD.

Makers of Railway Switches and Crossings, Layouts,
Cast Iron Chairs and Base Plates, etc.

MIDLAND FOUNDRY SANDIACRE NEAR NOTTINGHAM

Telephone: SANDIACRE 3141 (5 lines) *Telegrams: "TAYLOR BROS." SANDIACRE*

Established 1858.

LONDON OFFICE: 59, GORDON SQUARE, W.C.1

Telephone: MUSEUM 2821 *Telegrams: TORRIDITY, LONDON*

MASSEY

FRICTION DROP STAMPS

Messrs. Wilkinson Tools Ltd., take a proper pride in their very modern Drop Stamp Department, which is exclusively equipped with Massey Self Contained Automatic Friction Drop Stamps — three of 7 cwts and one of 10 cwts. — for forging their famous "Super" brand hand tools. They enjoy high-speed production of clean, accurate stampings at minimum labour cost.

Masseys also Make Steam and Compressed Air Hammers, Spring Power Hammers, Pneumatic Power Hammers, Double-acting Steam and Compressed Air Stamps, Trimming Presses, Forging Presses, Friction Screw Presses, Tyre Fixing Rolls. Please write for catalogues and indicate your classes of work.

Three of the many different tools forged by Wilkinson Tools Ltd. on Massey Friction Drop Stamps.

B. & S. MASSEY LTD. OPENSHAW • MANCHESTER • ENGLAND

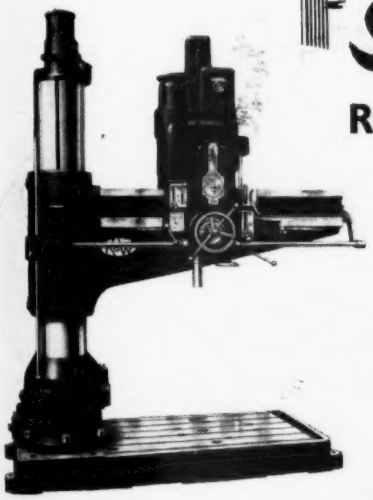
Makers of the World's greatest range of Forging Plant

Hopwood

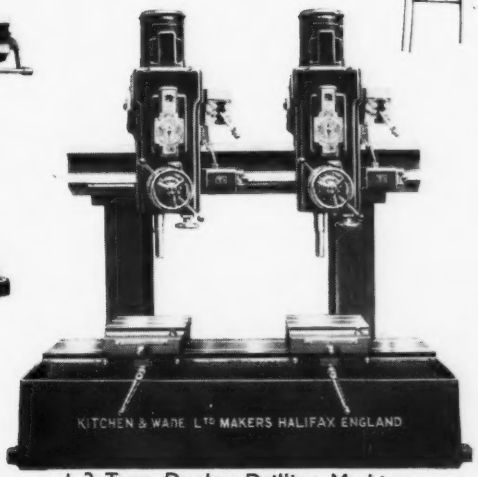
K&W

G.8 Type Three Head Solebar Drilling Machine

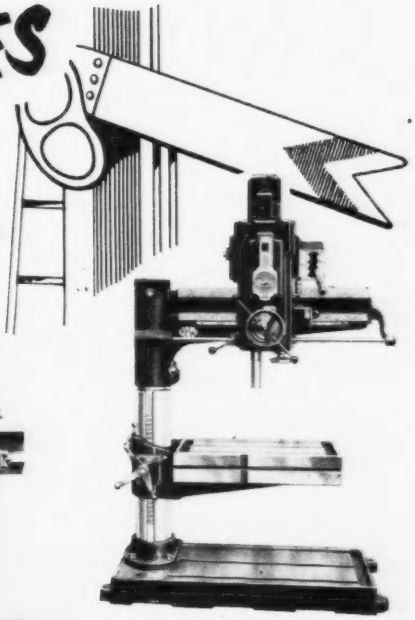
SIGNAL SUCCESSES IN RAILWAY WORK



E.27 Type 6' 0" Radial Drilling Machine



L.3 Type Duplex Drilling Machine



T.4 Type 4' 0" Radial Drilling Machine

PHONE 61173

KITCHEN & WADE LTD

HALIFAX · ENGLAND

GRAMS 'KAW' HALIFAX

How round is perfectly round?

within 1/40,000th of an inch

This illustration shows part of a testing machine capable of measuring the diameter of fine wires to one millionth part of an inch. UNIFORM ROUNDNESS is of the greatest importance in ensuring satisfactory performance and the very fine 15W filament wire has to be accurate to one forty thousandth of an inch. The slender yet accurate filaments in electric lamps have to maintain their shape even when heated to temperatures around 2500°C. QUALITY CONTROL rigorously applied throughout manufacture ensures uniform excellence.

METROVICK LAMPS

Quality control - throughout

METROPOLITAN-VICKERS ELECTRICAL CO. LTD., ST. PAUL'S CORNER, 1-3 ST. PAUL'S CHURCHYARD, LONDON E.C.4

Member of the A.E.I. group of companies

S/A201

[To face first text

THE RAILWAY GAZETTE
A Journal of Management, Engineering and Operation
INCORPORATING
Railway Engineer · TRANSPORT · The Railway News
The Railway Times · Herapath's Railway Journal ESTABLISHED 1835 · THE RAILWAY RECORD. · RAILWAYS ILLUSTRATED · THE RAILWAY OFFICIAL GAZETTE

33, TOTHILL STREET, WESTMINSTER, LONDON, S.W.1.
Telephone: WHitehall 9233 (12 lines) *Telegrams: "Trazette Parl, London"*

BRANCH OFFICES
GLASGOW: 87, Union Street. . . . . *Central 4646*
NEWCASTLE-ON-TYNE: 21, Mosley Street . . *Newcastle-on-Tyne 22239*
MANCHESTER: Century House, St. Peter's Square . . . *Central 3101*
BIRMINGHAM: 90, Hagley Road, Edgbaston . . . *Edgbaston 2466*
LEEDS: 70, Albion Street . . . . . *Leeds 27174*

Annual subscription £4 10s. 0d. post free. Single copies, Two shillings
Registered at the G.P.O. as a newspaper Entered as second-class matter in U.S.A.

Vol. 96] FRIDAY, FEBRUARY 8, 1952 [No. 6

CONTENTS

	PAGE
Editorial Notes	141
Royal Commission on New Zealand Railways	143
British Railways Traffic Apprentices	144
Letters to the Editor	146
The Scrap Heap	148
Overseas Railway Affairs	149
Marshalling Yard Improvements, Scottish Region	150
First British Main-Line Freight Electrification	152
Preventing Ice Formation on Conductor Rails	157
Personal	159

H.M. King George VI

THE sudden death of His Majesty the King, which was announced from Sandringham at 10.45 a.m. on February 6, has occasioned world-wide and profound grief. King George the Sixth was a man who devoted his life to duty. From his earliest years as a naval cadet and throughout his reign as an honoured King he kept this ideal ever before him. The King was a man of simple tastes; he found his relaxation and greatest pleasure in family life and it was on family happiness that he based both his personal life and his official career. The early part of his reign was overshadowed by the threat of war and more than any King since George II he saw service with his troops in many distant battlefields, as well as sharing intimately the perils of his subjects at home. In the summer of 1938 the King and Queen paid a State visit to Paris, travelling by train from Victoria to Dover and Boulogne to Paris. In the course of the next year they undertook a tour by Royal train in Canada and the United States. When the King ascended the throne in 1936, the British railways had become alive to the publicity value of high-speed passenger services, and in view of the close associations between the Royal Family and Scotland it was fitting that the streamline trains which the L.M.S.R. and the L.N.E.R. introduced in 1937 should have been given the names of "Coronation Scot" and "Coronation." During the war, when many railwaymen were decorated for meritorious service, the King and Queen frequently toured the country in the Royal train.

Organisation of Transport

WITH the resumption of parliamentary sittings interest has revived in the policy which the present Government is likely to adopt in any reorganisation it decides to make in the nationalised transport system of this country. It is known that a good deal of thought has been given to the matter since the Government took office. This is not surprising in view of the trenchant criticisms of the organisation which it made during its period in opposition. On the other hand, as was suggested in our December 28 issue, there is a clear recognition of some of the difficulties and dangers which must attend any hasty action at the present time. Naturally in transport circles there has been a great deal of speculation as to what the future may hold. It is clearly undesirable that the British transport system should become the plaything of politics, and that with every change of Government unrest and possibly apprehension should be engendered among those on whom must rest the task of ensuring the operation of so fundamental a service. It is unlikely that any major change in organisation or personnel will be made hastily. If and when major alterations are decided on in the present organisation there can be no doubt that there will be a full appreciation of the need for careful thought and a dispassionate survey of the repercussions of any course of action which may commend itself to the Cabinet. It is not without interest to note that the recent White Paper on Public Boards showed that the current terms of office of the large majority of members of the British Transport Commission and its Executives expire next August or September. This, therefore, would be a convenient time at which to bring about any changes in organisation which might affect the personnel of these bodies.

Reduced Foreign Travel Allowance

IT is early to assess the effect on British transport of the reduction to £25 of the annual foreign currency allowance for holiday travel announced last week by the Chancellor of the Exchequer, Mr. R. A. Butler. Potential travellers to the Continent may think twice over spending a considerable sum—even although this usually will not count against the £25—on fares to a place where they can afford to stay for, say, ten days; regions nearer Britain will tend to gain tourists at the expense of more distant parts. Rail and sea travel will have the advantage over air and motor-coach travel and private motoring, with their stopovers necessitating disbursement of currency. Luxury travel will be the most affected, which will reduce travel by the "Golden Arrow" and similar services already suffering from the effects of air competition. British Railways marine services, however, may be able to make up on the roundabouts much of what they lose on the swings, for previous currency restrictions since the war showed that Ireland is chosen as a holiday area when the Continent is barred. To get the most from the potential Irish travel, arrangements for better facilities should be put in hand well in advance of the holiday season, or the major advantage will accrue to Aer Lingus.

Sale of the G.N.R.(I.)

THE Governments of the Republic of Ireland and Northern Ireland are to buy the Great Northern Railway (Ireland) for £4,500,000. They have accepted the offer of the G.N.R.(I.) directors for voluntary sale at that sum. The directors were informed at a joint meeting last October that the Ministers of the two countries, while prepared to proceed to the compulsory acquisition on their own terms —£3,900,000—of the company's undertaking, would consider an offer for its voluntary sale on slighty more favourable terms if such a proposal were made on behalf of the stockholders. After consultation with the stockholders the directors have made what is tantamount to an offer for voluntary sale at the higher sum, and the two Governments, subject to the approval of their Parliaments, agreed to accept it. As neither the directors nor the stockholders of the railway have legal power to sell the

undertaking, the approval of the Parliaments will be sought in a Bill to provide for the transfer of the undertaking for this sum to the two Governments in accordance with the principles already agreed between the Ministers. As we have recorded, they have agreed to set up a joint Board with equal representation to operate the system. Last week the Minister for Industry & Commerce in the Dublin Government said that legislation to enable his Government to join with Northern Ireland in taking over the railway would be forthcoming in two or three months.

R.E.(Tn.) Supplementary Reserve

FIELD-MARSHAL SIR WILLIAM SLIM, Chief of the Imperial General Staff and Honorary Colonel of the Royal Engineers (Transportation) Supplementary Reserve, presided at the Officers' Annual Dinner on Friday last. He was full of praise for the efforts which had been made by the officers of the Reserve in the training, especially of the "Z" reservists during the past year. He congratulated the reserve on the high standard of efficiency that it was maintaining. Viscount Waverley, Chairman of the Port of London Authority, who responded to the toast of the guests proposed by Field-Marshal Slim, was making his first public speech since he assumed his new title. He said he was glad to know that the dock companies were now at much improved strength and he pledged all possible assistance by the employers to assist in maintaining efficiency. Brigadier C. E. M. Herbert, Commandant of the R.E. Transportation Centre at Longmoor, said that a number of officers from the Reserve at the present time were serving overseas. He read a message of greetings from them, and a reply which had been despatched on behalf of those present at the dinner.

Overseas Railway Traffics

AGGREGATE gross earnings of the Canadian Pacific Railway rose from £126,192,000 in 1950 to £142,971,000 last year, but the £16,779,000 improvement was more than offset by the accompanying advance in working expenses. Net earnings for 1951 amounted to £8,971,000 and were £3,736,000 lower than in the previous year. C.P.R. gross earnings for December contributed £591,000 to the total increase over the year, and working expenses for the month rose by £1,186,000 to £10,870,000. The improvement in Antofagasta (Chili) & Bolivia traffics has been maintained in 1952, with a £87,030 advance to £304,340 in the fortnight ended January 25. Aggregate receipts for the first four weeks of 1952 amounted to £525,600, as compared with £395,530 for the equivalent period of 1951. Costa Rica traffics for the half-year ended December 31, had made a total advance of c 1,079,944, at c 7,260,673; while the receipts for the month of December amounted to c 1,313,267.

Enlarging East Scottish Marshalling Yards

BEFORE the war, half the coal mined in Fife and Clackmannan was exported, mostly through the Fife Coast ports of Methil and Burntisland, which the former North British Railway developed for this trade. It was hauled direct from colliery to the ports for shipment, and the wagons did not have to be assembled at yards intermediately. Now, although more coal is mined, most of it is consumed in Western Scotland and the traffic flow is thus westwards instead of mainly eastwards from the coalfields. In 1949, the output of these pits was some 7,300,000 tons; the National Coal Board plans to increase it to 11,000,000 in the next 10-15 years. The existing mineral marshalling yard facilities in the district were inadequate to cope with re-routed and increased coal traffic, and the Railway Executive therefore put in hand in 1948 a scheme of yard development at Oakley, on the Dunfermline Upper-Alloa line, and Kelty, on the Dunfermline-Perth line. Elsewhere in this issue we describe the work involved in an illustrated article from which it will be seen that good progress is being made.

Neglected Stations

LAST week *The Manchester Guardian* expressed in a leading article in connection with the collapse of the station footbridge at Bury on January 19, its misgivings on the structural stability of some British Railways stations and commented that it was hard "to accept that the admitted troubles of the railways . . . justify the slovenliness and decayed appearance of so many stations." Mr. D. S. M. Barrie, Public Relations Officer, the Railway Executive, has been quick to answer that instructions have always existed, and recently have been renewed, on maintaining safety standards. He also draws attention to the great efforts made by the Railway Executive in the last four years to keep its stations trim and in good repair. In 1948-51, over 2,800 stations, or 43 per cent. of the total of some 6,500, have been repainted, and in some cases completely renovated, at a total cost of more than £3,000,000. This was the utmost possible in the light of the large amount of maintenance deferred by the war, of the many other claims for railway rehabilitation, of the successive calls for economy, and of the dearth of manpower and materials.

Electrification Between Wath and Dunford Bridge

THE first stage of the Manchester-Sheffield electrification scheme, initiated in 1936 by the L.N.E.R. but in abeyance during the war, has been completed, and since February 4 all coal traffic between Wath-on-Dearne, in the South Yorkshire coalfield, and Dunford Bridge, just east of Woodhead Tunnel, has been electrically worked. Since it was resumed in 1947 the scheme has been beset by economic and geographical difficulties, including shortage of materials, bad weather, and ground subsidence caused by mining. As will be seen from our article on the Wath-Dunford Bridge section, which begins in this week's issue, the work, which is the first example of a section of a British main line electrified for freight traffic—the Shildon-Newport electrification of the North Eastern Railway was of a mineral line throughout—presents interesting and novel features. Some of the structures and many of the overhead gantries have had to be designed or reconstructed to allow for settlement of the ground.

Use of Bo-Bo Locomotives

THE service between Wath and Dunford is being performed by 28 Metrovick Bo-Bo locomotives, releasing steam locomotives for duty elsewhere. The prototype has been running for some time in Holland on loan to the Netherlands Railways on which it has given good account of itself. The great saving in time on both loaded coal trains westbound and the empties eastbound is considerable. Down the long 1 in 40 Wentworth Bank regenerative braking is used with trains of returning empties; up the incline two electric locomotives do the work which formerly required four steam locomotives. Climatic conditions this winter, including a severe blizzard last week, have provided a rigorous test for the new system during the period when drivers have been training. Between Penistone and Dunford Bridge all trains, except those from and to Wath, will continue to be steam hauled, until the whole scheme is completed, possibly in 1954. The full project, whose estimated cost was £2,500,000 before the war, and is now some £10,000,000, is expected to save about 100,000 tons of locomotive coal.

Economics of Diesel Traction

SOME people regard the diesel locomotive as a panacea for almost all our railway ills. This is certainly not the case, but, as was pointed out in our issue of December 28, 1951, recent investigations into the shunting engine position in all Regions of British Railways have shown that economies can be obtained and efficiency increased by dieselisation in marshalling yards and goods depots. For this reason British Railways have decided to add 573 diesel shunters to their existing fleet in the next five years. An article in a recent issue of the *British*

Railways Magazine goes into the question of diesel traction in relation to steam as a whole. The fact is brought out that, whereas a 4-6-2 steam engine costs from £20,000 to £22,000 and a 4-6-0 mixed-traffic locomotive £18,000, today a main-line diesel-electric locomotive costs between £70,000 and £80,000. Savings and increased efficiency must be of a high order to offset first costs of this calibre. Moreover, something like 148,000 railwaymen are involved, together with locomotives and tenders to the value of £104 million. The average life of a steam engine, which is easy to build and maintain, is from 30 to 40 years, and the life of the complicated diesel-electric machine has been estimated at 30 years. It is with the background of these problems that the present tests with main-line diesels on British Railways are being carried out.

Royal Commission on New Zealand Railways

THE New Zealand Government is to appoint a Royal Commission to investigate the condition of the railways and their development and sphere of operation. The Minister of Transport & Railways, Mr. W. S. Goosman, states that the Cabinet considered a report from Mr. H. C. Lusty, General Manager of Railways, and decided that a Royal Commission was the only satisfactory way of meeting the situation.

"Throughout the whole railway system on the operating side the staff is insufficient to handle the traffic offering and the staff is decreasing in numbers while traffic is increasing," said the Minister. "Unduly long hours have been worked by these men and it became necessary to reduce the hours of work to reasonable limits. As a result of this action passenger services had to be curtailed so that the railways could continue to handle essential heavy goods traffic."

In the locomotive running branch alone the staff today is 204 fewer than in 1939, yet traffic in ton-miles has increased by more than one-third since then. The shortage of men in workshops staff was seriously affecting the maintenance and repair of locomotives, wagons and coaches in the North Island and causing grave concern. In the Hutt Workshops, where major locomotive overhauls were carried out, the staff numbered 2,160 in 1939; on March 31 last it totalled 1,261 and it had fallen to as low as 1,126 by Christmas.

The Hutt shops are equipped both for building new locomotives and rolling stock and for maintenance and repair work. Not only was there no staff for new construction but the number of men in the shops was about 400 short of that actually needed for the purposes of normal maintenance and repair work.

The Minister said that in recent years the number of complete overhauls of locomotives had decreased very considerably. On the average 133 major overhauls should be done each year to maintain North Island locomotives in good order but this figure had not been reached since 1944. Last year the total of major overhauls was 100; this year it was estimated that it would be only 90. Locomotives overdue for major overhauls in the North Island at present totalled approximately 30 per cent. and the number would increase. There was a shortage of engineering staff and workmen to build new goods yards and sheds and extend existing yards.

"There is no doubt that the major transport burden of the Dominion will continue to fall on the railways for many years to come," said Mr. Goosman, "and they must therefore keep pace with the country's production and, if possible, be a few steps ahead." In addition to the normal growth of traffic the railways would be expected to handle large quantities of timber and other products from the new Tokoroa line and from the Murupara area when it was developed. To handle the increased traffic the railways had to have, in addition to a regular supply of new equipment, the staff to bring up existing equipment to a satisfactory standard and maintain it at a satisfactory level of efficiency.

There also had to be sufficient staff to work all the trains needed without men having to work excessive hours. As it was the railways were losing staff, some of them to industries less vital. In the immediate future the railways would not be able to handle all the traffic offering. Train services would have to be restricted to those which could be operated by the available staff without working excessive hours.

The Commission also would have clearly to define the sphere of other forms of transport, particularly road transport, in relation to the railways. Another problem to be investigated was the desirability or otherwise of abandoning any part of the railway system. The railways' resources ought not to be dissipated in handling traffic more suitable for road transport to the detriment of the railways and the country as a whole.

The Commission's terms of reference and their ancillaries, would give full scope for inquiry into all aspects of the railways, said Mr. Goosman, and into their future development and operation.

Nyasaland Railways

THE Nyasaland Railways report for the year ended December 31, 1950, received from Mr. W. M. Codrington, Chairman & Managing Director of the company, points out that increases in traffics and revenues during the year justified the increased equipment and facilities provided in the past. Railway goods tonnage increased from 178,000 tons in 1949 to 208,000 tons during the year under review, the gross earnings from this source rising by £73,000. The revenue account provides nearly £14,000 more than in the previous year for renewals, owing to rapidly-increasing prices, and in addition a reserve of £3,757 is allocated to cover higher costs of replacements. A sum of £26,115 has also been placed to tax equalisation reserve to ensure that in future years only a fair share of tax liability has to be met. After making these provisions and paying interest on the 3½ per cent. first debenture stock, £54,616 was available for interest on the 5 per cent. bridge debenture stock, this sum being derived from the earnings of the Zambesi Bridge and its south approach; bridge earnings contributed £50,872 of this amount compared with only £19,743 in 1949.

The following are some of the principal results of working the Nyasaland Railways, excluding its subsidiary the Central African Railway Company, for 1949 and 1950:—

	1949	1950
Goods tonnage (railway)	178,065	208,394
Passenger journeys (railway)	298,977	322,172
	£	£
Goods receipts	302,052	375,694
Livestock and vehicle receipts	1,583	2,020
Passenger receipts	52,691	56,367
Baggage and parcel receipts	4,975	6,758
Gross receipts (including road and lake services) ...	386,393	473,499
Working expenses (including road and lake services)	328,299	403,784

The operating ratio, including provision for renewals, was therefore 85·27 per cent., as against 84·96 in 1949. Expenditure was higher under all headings except miscellaneous expenses, which was £34,000 lower than in the previous year, as a result mainly of reduced hire charges for locomotives from other railways, made possible by the delivery of new engines from the manufacturers. These were seven "G" class locomotives, and goods vehicles also were received. The new engines have enabled a slightly accelerated passenger service to be provided between Nyasaland and Beira, but when the diesel railcars now on order are placed in traffic—probably towards the end of 1952—the time taken from Limbe to Beira is expected to be halved.

Outstanding achievements during the year were the completion and opening of the new bridge over the Shire River at Chiromo, and the re-erection, launching and successful trials of the new lake steamer, *Ilala II*, at the new lake terminal, Monkey Bay. The wireless network now in service between various lake ports and the lake steamers and also with railway headquarters at Limbe was described in our issue of June 9, 1950. Reconstruction and extension of the railway workshops continued, and much of the machinery and equipment has reached Africa. The road services were increasingly in demand and, like the railway, did good service in carrying supplies to famine areas.

Wind Tunnel Experiments

THE view that railway aerodynamics has reached a stage where hitherto unavoidable assumptions in estimating the magnitude of any scale effect have become increasingly unsatisfactory, and that a carefully planned investigation with comparative wind tunnel and full-size tests would be of the greatest value, was expressed by Mr. D. W. Peacock, Senior Research Assistant, Railway Executive, in a paper on wind tunnel work recently presented to the Institution of Locomotive Engineers. Mr. Peacock has been closely associated with the work carried out in the Derby tunnel and his paper gave a brief account of the work carried out there. Wind tunnels were used because aerodynamics was as yet a science in which basic theory had only partly supplanted empirical laws and practical trials; moreover, aerodynamic theory was often difficult and idealised.

Such an approach appeared noticeably in railway tunnel work, which was often concerned with *ad hoc* experiments and was usually carried out on bodies of poor aerodynamic shape, and which solved problems when aerodynamic considerations had to be balanced against other and possibly conflicting engineering or operating requirements. Consequently, although wind tunnel work sometimes appears haphazard by comparison with other techniques, its results were no less valuable and could not be obtained in any other way. When the L.M.S. "Coronation" class locomotive was designed the Derby tunnel was used to develop the best streamline form. Tests were first made with the locomotive in its original condition and then with a streamline boiler. Various alternative model heads were used with the streamline boiler which showed considerable improvement on the original locomotive; the shape finally adopted gave the best results, and these are given in the following table:—

AIR RESISTANCE OF "CORONATION" LOCOMOTIVE, HEAD No. 4

Resultant wind speed, m.p.h.	0 deg. Yaw (in still air train speed = resultant wind speed)				20 deg. Yaw							
	Original locomotive		Streamline locomotive		Longitudinal force, lb.		Lateral force, lb.		Total air resistance			
									Tractive force, lb.		H.P. absorbed	
	Air resistance, lb.	H.P. absorbed	Air resistance, lb.	H.P. absorbed	Original locomotive	Streamline locomotive	Original locomotive	Streamline locomotive	Original locomotive	Streamline locomotive	Original locomotive	Streamline locomotive
60	742	119	336	54	1,180	590	2,750	2,920	1,220	630	195	100
80	1,318	281	598	128	2,100	1,045	4,880	5,190	2,170	1,120	460	240
100	2,061	550	934	249	3,280	1,630	7,630	8,110	3,390	1,750	905	465

NOTE.—The values for the total air resistance at 20 deg. yaw are based on the result of a model experiment which indicated that the tractive resistance due to a lateral force amounted to 1·45 per cent. of the lateral force. The values tabulated for horse-power at 20 deg. yaw relate to the special case of a side wind blowing at 35 per cent. of the train speed at an angle of 80 deg. to the train direction; under these conditions, the velocity of the resultant wind has the same speed as the train and is inclined at 20 deg. to the length of the train

In the design of the British Railways standard Class "7" locomotive wind tunnel work was of assistance in improving the comfort of the standard cab. During the design stage it was expected that there might be draughts in the cab through the shovelling plate-hole, and also through the space between cab and tender; resultant wind tunnel tests showed that these assumptions were correct and the design was suitably altered. The wind tunnel was used during the preliminary stages of the design of the Fell diesel-mechanical locomotive, when it was suspected that hot air discharged from the trailing end engines might find its way into the trailing end radiator again, and so lead to an appreciable amount coming from the leading end.

This could not be cured by aerodynamic means and the two radiators and cooling systems were interconnected. The object of a wind tunnel was, briefly, to obtain a uniform and regular windstream under control for speed and direction. A second and no less important feature of wind tunnel work is that it lends itself to the use of models. Often full-scale aerodynamic work is impossible or impracticable, and by contrast a model can be made at relatively low cost, and can be easily altered during the course of tests. The tunnel has also been used for determining air extraction capacities of railway carriages and ventilators and for investigating wind loading on V-roof station buildings. This investigation enabled the railway Civil Engineering Department to formulate a design code for wind loadings on platform awnings of this type. It would appear that the wind tunnel has found its greatest value not in streamlining or similar tests, as is generally supposed, but in the large variety of miscellaneous problems on which it has been used.

British Railways Traffic Apprentices

IN March, 1950, the Railway Executive announced a new scheme for the selection and appointment of men for special training. The object of this scheme is, in the words of the official circular, "To give limited numbers of selected men a wider insight into the commercial, operating and motive power work of the railway to assist them in qualifying for consideration for promotion to the higher administrative and executive posts." Those selected are known as traffic apprentices. The scheme replaced somewhat similar arrangements made by the former main-line companies and before the introduction of the new scheme it was discussed with the railway unions and accepted by them.

Appointments as traffic apprentices are made in two ways. First, from members of the staff who pass a preliminary written examination, and secondly, from university graduates or ex-regular officers. Candidates must not have passed their twenty-eighth birthday. The preliminary examination is conducted by the Royal Society of Arts and consists of three papers—railway subjects (operating and commercial), general knowledge with special reference to geography of Great Britain, and English. The successful candidates then go before a selection committee at the Regional headquarters. This board consists of a small number of departmental officers. As a result of this interview a smaller number of men go forward for final interview by the Railway Executive Central Selection Committee. The inclusion of a representative from a trade union on this committee marks a considerable advance in staff relations, and should banish from anyone's mind the suspicion that selection is biased in any way. Those selected by this committee are seen by the Chief Regional Officer of their Region before commencing their training. University graduates and ex-regular officer candidates are interviewed by the Railway Executive Central Selection Committee.

The course of training of a traffic apprentice usually lasts three years. He begins at a small passenger and goods station to learn the groundwork of railway accountancy.

including how to balance the passenger and goods accounts for the month, and to gain an introduction to operating work. Then he goes to larger passenger and goods stations, to a District Operating Superintendent's office (including a period in the Control Office), a District Motive Power Depot, with the particular attraction of three weeks as third man on the footplate, and then to a Divisional Operating Superintendent's Office. He gains experience of all sections of a District Commercial Superintendent's office and his training concludes with a period in the Regional Headquarters offices of the Operating, Commercial, and Motive Power Superintendents.

A traffic apprentice is required to take advantage of the educational facilities offered by the Railway Executive at evening classes. He has to submit a report to headquarters on the training he has received during each phase, and he is interviewed periodically at Regional headquarters as to the progress he is making.

The rates of pay for traffic apprentices vary according to the age at which the men enter the scheme. Those entering at 21 or 22 are paid £372 10s. in their first year, £399 10s. in the second, and £432 in the third, while a man entering at 26 or 27 receives £443, £470, and £502 in the three years. Traffic apprentices are allowed annual leave with pay, travelling facilities and allowances on the same scales as other clerical staff of the railways, and are subject to the same rules and regulations. At the end of the training period, a traffic apprentice is appointed to a position for which he is considered suitable. He then takes his place in the normal channel of promotion in the service. He has no special right to promotion. If the Railway Executive considers there is insufficient justification for the continuance of a traffic apprentice's training it can discontinue it, and the man will revert to his former position in the service.

This new scheme is open to all members of the railway staff under the age of 28, whether salaried or wages grades. It represents a fine opportunity to the keen and ambitious railwayman to learn more about his profession, and he has the satisfaction of knowing that if he becomes a traffic apprentice he has done so in open competition against the whole country. The competitive examination and method of selection remove any suggestion of privilege. The majority of traffic apprentices are selected from the staff, and this scheme offers a good opening to anyone joining the railway service.

Erection of Large Bridges

ONE of the many important considerations that influence the design of a large railway bridge is the manner in which its superstructure is to be erected. Sometimes it is the governing factor, and in all cases erection is of primary importance. Ever-increasing loads are constantly requiring the reconstruction of bridges, and it was appropriate, therefore, that Mr. P. S. A. Berridge, Bridge Assistant to the Chief Engineer, British Railways, Western Region, should have selected the subject, "The Erection & Reconstruction of Large Railway Bridges," for a lecture by him to the Western Region London Lecture & Debating Society. With a wide experience of such works, he is well qualified to enlarge on this theme. India, where he gained most of it, is the land of large bridges, and the part of it served by the North Western Railway, of which he was at one time Deputy Chief Engineer (Bridges), is particularly rich in them.

His lecture opened by pointing out that the method of erection is dependent on such site conditions as the height of rail- above water-level, the type of ground on which the foundations must be built, the depth and velocity of the water, navigation rights, if any, and climate. The different erection methods adopted for a number of important bridges are then described, beginning with the pioneer works of Brunel at Chepstow and Saltash. For the twin trusses of the single 300-ft. span at Chepstow each of the 9-ft. dia. wrought-iron tubes, weighing 160 tons, was erected on the right bank of the Wye, launched forward on rollers, and its leading end floated on a pontoon across the fast-flowing tidal river, before being lifted 80 ft. to the pier tops by winch and cable. Each tube was launched and raised through the full height clear of the navigable waterway in a single day—a notable achievement a hundred years ago—and the trusses were completed *in situ*. At Saltash each of the two 455-ft. trusses, 56 ft. deep and weighing 1,060 tons, was erected complete on the bank before being floated out on pontoons and warped into position for lifting through 87 ft. by jacks to the pier tops —a process taking eight months for one span and five months for the other and not at any time closing the whole channel to navigation. The central pier was founded on rock more than 85 ft. below high water level and the method of its construction is of particular interest.

Mr. Berridge then enumerates the methods used for erecting girder-work today. It may be assembled on falsework *in situ*, either fixed or able to be floated into position; or erection may be on shore with subsequent floating and lifting, as at Saltash. Alternatively, the falsework may be cantilevered out fan-wise from the piers, as was done when the Indus Bridge at Attock was built in 1887. For many erections, all or almost all falsework may be eliminated; the superstructure is either built out as a cantilever itself or launched forward after assembly at one end of the bridge Erection is piecemeal in the cantilever method, and notable examples of it are the Forth and Quebec cantilever structures and most steel arch bridges. Nowadays the forward launching method, with or without a launching nose and, or, counterweight, is widely favoured, and is invaluable in rapid military operations.

A point to be noted is that the closing of the steelwork in all large cantilever erections has to be made with great care, as even slight variations of temperature appreciably affect the length of opposing cantilevers. Mr. Berridge emphasised this in the discussion after his lecture, by explaining the precise measures taken in the erection of the three-pin 180-ft. Reond steel arch on the Kangra Valley line. A special steel tape stretched under carefully-controlled tension was used to check all measurements in the makers' works at Bombay, and the same tape under the same tension was used again for erection in northern India, due allowance being made for differences in temperature there and in Bombay. In the erection of each half of this arch as a cantilever, a simple toggle arrangement was incorporated in the temporary tie-back, by which precise adjustment was obtained when the two arms met and the centre pins were inserted.

Four well-tried methods of bridge reconstruction were referred to: slewing; enveloping; with the aid of a service span; and using the existing bridge for the erection of a new one alongside. Slewing or rolling transversely—and usually the old span out and the new span in simultaneously—is the commonest. Enveloping involves building the new structure round the old. A service span is required to maintain the flow of traffic when the new girder-work cannot be erected before the old is removed. The replacement of the two 308-ft. single-line spans at the Attock Bridge is an example of enveloping quoted.

In the reconstruction of the seventeen 150-ft. spans of the Victoria Bridge over the Jhelum, a pair of through-type truss girders erected inside the old girders was used (*a*) to carry the decking and pass traffic without interruption, (*b*) to support the old girders while they were cut up and removed piecemeal, and (*c*) to provide runways on the top chords for carriages from which the new girders could be hung and brought into position. The 34 new girders were erected in turn, one on each side of the approach track, and suspended from carriages on a temporary staging spanning the track. They then travelled forward along the staging and across and outside the newly-completed span or spans—still suspended from carriages, running on the top booms—until they reached the service span; there they were traversed inwards into their final positions. Mr. Berridge concluded with a description of the complicated measures taken in the doubling of the seven 300-ft. spans of the Roopnarain Bridge, on the Bengal-Nagpur Railway near Calcutta. Though this was not truly a reconstruction, it was an unusual operation.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Cheaper Single Railway Fares

February 5

SIR,—The tentative conclusions which lead your correspondent in last week's issue to advocate experimental single fares at half the ordinary single rate are derived from a mistaken interpretation of certain figures published in *Transport Statistics*. They also appear to ignore the recent decision of the Transport Tribunal to reduce the standard fare from 2·44d. to 1·75d. per mile.

The two tables of figures given in your correspondent's article, although the second table is headed "Ordinary fares," refer to the "full fare" section of the ordinary fares category in both cases and should be so described. Again, when estimating the average distance travelled, based on the standard full fare rate of 2·44d. per mile, third class, your correspondent has, I think, overlooked that the average receipts for traffic to which the 2·44d. rate applies comprise first and second class receipts as well as third class.

From the changed trend of originating journeys and average receipts during the period between October, 1950, and September, 1951, your correspondent concludes that this marked a swing of traffic back to rail. There does not, however, appear to be any evidence of a considerable reversion to rail as a result of increased bus fares in the country as a whole.

The increase which occurred at the beginning of October, 1950, in the number of journeys at full fares and the decrease in the average receipt per full fare journey was due to the introduction of the London Area Passenger Charges Scheme. Under that scheme the London Tilbury & Southend line of the Eastern Region were changed from the British Railways fares scale to the London Transport fares scale. As a consequence there was a big changeover of short-distance traffic from monthly return, excursion, and other cheap fares to the full fare on the London Transport scale. This has been a prominent feature of the Eastern Region passenger journey statistics every month from October, 1950, when the increase over the corresponding month in 1949 in full fare journeys was 1·6 million or 207 per cent. right up to September, 1951, with an increase of 108 million or 183 per cent. As soon, however, as the months became comparable again in October, 1951, the Eastern Region full fare journeys increased by 77,000, or only 3 per cent.

Yours faithfully,

J. H. BREBNER,
Chief Public Relations & Publicity Officer

British Transport Commission, 55, Broadway, London, S.W.1

Staff Recruitment

January 31

SIR,—Your editorial note on staff recruitment in your January 25 issue, wherein you indicated the methods by which the Railway Executive is making an appeal for recruits to the service, will be of great interest to all working railwaymen, but I sometimes feel that the general public has no idea why it is that more applications are not forthcoming for employment in the transport world.

You indicate how overtime and Sunday work are not only expensive but also make heavy demands on the operating staff involved. This is very true, and perhaps has some bearing on the shortage of manpower in the industry. Anyone who has had to work night shifts, often for seven nights a week, with all the difficulties of obtaining proper rest because of the natural noises during the day combined with the modern demon of the next door neighbour's wireless, knows the low ebb which a man's physical condition reaches by the end of the week. It is difficult to picture a shunter in a busy marshalling yard, or a signalman in a box which handles extensive traffic, trying to work efficiently under the handicap of short or inadequate rest.

In the old days the railways were proud of the fact that family tradition entered into and was a feature of railway employment, and sons regularly followed their fathers into the service. In these enlightened days of increased standards of education, when sons see the detrimental effect shift working at all hours of the day and night has on their fathers' health, with the lack of normal family and domestic life, they decide not to follow the same path. Some day the community will have to recognise these facts, and although money is no adequate compensation for a lack of complete health and vigour, it will have to be recognised that those who work at awkward hours must have periods of rest in between the shift working if the industry is ever to be as efficient as you and I would wish.

If I may say so, I think you portray in a fair way all the difficulties surrounding railway staff and operation, but perhaps it is too much to expect that our fellow countrymen, who use the railways as a means of travel, should not forget the difficulties and physical effort of those who man the Iron Road.

Yours faithfully,

H. W. FRANKLIN
President

National Union of Railwaymen, Unity House, Euston Road, N.W.1

Southern Region Diesel-Electric Locomotives

January 28

SIR,—In reply to Mr. Hammond's letter in your January 18 issue, I cannot see that on the figures so far published the Southern Region diesel can show any saving in fuel costs on a conventional steam locomotive. In fact, I wondered whether the figures given in your November 9 issue covered oil consumed in train heating boiler.

The diesel locomotive would, however, have to show a fuel saving in the region of that quoted by Mr. Hammond to offset additional capital cost and probable increased maintenance costs. As for Mr. Hammond's other points, it seems doubtful if, as things stand at the moment, the introduction of diesel locomotives would lead to an appreciable cut in station times. This is seldom excessive for locomotives taking water with the possible exception of Salisbury which is a special case because of the lack of water troughs on the Waterloo to Exeter run.

As far as availability is concerned, I still say that full use cannot be made of this even if timetables are re-cast. I have not access to the necessary figures but on the Southern Region the multiple-unit electric sets have an availability of about 95 per cent., but I should be surprised if the average user is as much as 50 per cent.

I thank Mr. Novak for his letter in the same issue, which is certainly quite an "eye-opener." I should like to hear more of this. Recently I had been coming to the conclusion that one of the reasons for American railways going over to diesel power in a "big way" is that American locomotive builders prefer to build diesels!

Yours faithfully,

J. B. LATHAM

18, Wheatsheaf Close, Woking

Railway Carriage Design

January 26

SIR,—As the question of open *versus* compartment stock has again been raised in your columns, I should like to suggest a compromise design which would appear to meet the objections to both systems. The traditional open coach layout would be combined with partitions between the backs of all the seats and draught screens extending along about half the width of each seat on the gangway side.

Might I also endorse Mr. Harman's remarks in your

January 18 issue on the riding qualities of modern British stock. Although I have not yet travelled in the Shenfield electric stock, the antics of the bogies, viewed from another train travelling in the same direction, are extremely alarming. It has been amply demonstrated by the Swiss and others that it is possible to build motor coaches that ride smoothly. It is perhaps significant that letters like Mr. Sorby's in your issue of June 22 last, and Mr. Buchert's in that of August 24 remain unanswered by the authorities.

The riding qualities of the standard British Railways steam stock also leave much to be desired and certainly do not bear comparison with those of Swiss and French coaches built during the last decade. At high speed the British bogies "hunt" to the accompaniment of much noise and vibration; the coach body acts in the same way, although at a more leisurely tempo.

Is it too much to ask of British Railways that they should keep more abreast of overseas developments, so that the riding qualities of their coaches equal their unexcelled comfort in other directions?

Yours faithfully,

HENRY BUTTER

Dunsmore, Maynard's Green,
Horam, East Sussex

British Standard Locomotive Design

January 26

SIR,—When the first announcement was made of the standard locomotive designs it seemed to me that the Class "6" Pacific would not be a very economical type. The details published in your January 25 issue justify the foreboding. Not for many years, I imagine, has such a poor power-weight ratio been obtained in a locomotive design; in these days of steel shortage is seems extraordinary that an engine weight of 88½ tons is needed to produce a tractive effort of only 27,520 lb.

The weight of the new type is considerably greater than any of the Class "6" and "7" 4-6-0s of the old companies. For example the rebuilt "Royal Scot" has a weight of 83 tons and a t.e. of 33,150 lb.; it is greater even than the Class "7" "West Country" Pacifics and only half-a-ton less than the "Kings." The power on the other hand is only five to ten per cent. higher than that of the Class "5" designs which weigh around 70 to 72 tons each. In other words, to enable the new engine to haul one coach more than a Class "5" it has been necessary to increase the weight by 17 or 18 tons.

It is true that tractive effort is not necessarily a good guide to performance and that the big boiler of the Class "6" will enable it to work harder than a Class "5," but with such a low adhesion weight it may sometimes be difficult to take advantage of this.

Apparently a good deal has been sacrificed to get a very low weight per axle and I cannot help wondering whether this is wise. There are few lines restricted to such weights where the slightly increased power available is going to be much use. The Highland line comes to mind, but the new engines will still need piloting on most of the heavier trains and are no solution to the problem. The need seems so limited that I should have thought that it could have been met by drafting a few "West Country" locomotives away from the Southern main lines rather than by building such an extravagant design as a standard. It is likely that many of the class will be working on lines where their low adhesion weight will be a disadvantage rather than a help—I notice that the allocations which you give for the first ten will involve working only over routes which are permitted to the heaviest former L.M.S.R. locomotives and where a "Jubilee" is a much more economical proposition.

Having criticised the Class "6" Pacifics I should like to suggest a more useful type for British Railways to develop, a mixed traffic 2-8-2, a type which is the maid-of-all-work on railways all over the globe. A Class "7" or "8" 2-8-2 with, say, 5 ft. 8 in. wheels could handle all but the fastest traffic, could have axleloads light enough for it to go over any main line, and with its good adhesion could pound uphill and recover from slacks in a way which no British type is able to do at present.

The post-war conditions on our railways are different from those before the war. Nowadays there is less opportunity for high-speed running and many more checks and slacks to recover from. In these circumstances the need for a modern eight-coupled passenger engine is greater than ever, and as a mixed-traffic type it would be suitable for hauling vacuum-fitted coal trains. Any advantage in running high-speed coal trains at the present time must be partly nullified by the need for two engines to haul them.

Yours faithfully,

D. J. O. FERRY

70, Grange Gardens, Pinner

Publications Received

The Story of the Assam Railways & Trading Company Limited, 1881-1951. London: Harley Publishing Co. Ltd., W.C.2, for the Assam Railways & Trading Co. Ltd., 154-6, Fenchurch Street, E.C.3. 10½ in. × 7½ in. 64 pp. Illustrated. No price stated.—The whole of this souvenir publication must be of great interest to those connected with railways in North Eastern India, both before and during the war of 1939-45, when the Dibru-Sadiya Railway, first as an independent system, the property of the Assam Railways & Trading Co. Ltd., and later, from April, 1942, worked by the Government of India with the aid of British, Indian, and American railway troops as part of the Bengal Assam Railway, formed the vital extremity of the Assam line of communication. The early history of the D.S.R. is given in detail, as well as developments from the Japanese invasion in 1942 to purchase by the Government in April, 1945. The important part of the railway in developing the Assam tea and oil industries is described. A chapter is devoted to the Japanese war. The book will recall to many who served in Assam vivid memories of the D.S.R., with its brown locomotives and brown-and-white coaches, well maintained even at the height of the war. Space doubtless allowed no more than a bare mention of past employees—a former Manager (1928-35) was G. E. (now Sir George) Cuffe—and of the magnificent work of their womenfolk in 1942-45.

Rotary Wire Brushes.—This illustrated catalogue issued by A. Lerson & Sons Ltd. lists a variety of wire and bristle brushes in the manufacture of which this firm has been engaged for the past 70 years. Among these is a selection of rotary wire brushes, designed to meet a rapidly increasing demand for power-driven units for cleaning metals and rubber, and for the removal of scale. The firm has devoted considerable time to wire research and experiment in recent years and claims that the copite steel wire now used has long fatigue life and will stand up to any test.

Metalastik Spherical Bushes.—Details of the spherical bushes fitted to the swing-link suspension of the British Railways gas-turbine locomotive No. 18100, described and illustrated in our February 1 issue, is contained in an illustrated brochure published by Metalastik Limited. Developed as an anti-vibration bush, forming a friction-less hinge free from wear, each swing-link bearing supports a weight of 9 tons. The inner sleeve and split outer housing are separated by a special grade of rubber permanently secured to both by the Metalastik rubber-to-metal weld. Swinging in any direction can take place by elastic deformation of the rubber. The illustrations include photographs of the swing-link arrangement and several diagrams showing the bush and pin assembly.

Summer Holidays Abroad, 1952.—The current summer holiday programme of Thos. Cook & Son Ltd. contains the usual wide choice of inclusive tours in Europe and also Cyprus and Madeira. The number of resorts has been increased, with a larger variety, especially in Germany, Italy, and Spain. Thos. Cook & Son Ltd. also have issued their separate programmes for France, for Italy, for Scandinavia, for Belgium, Holland, and Luxembourg, and for Switzerland, dealing fully with each.

THE SCRAP HEAP

Not Legal Tender

When a man was convicted recently for stealing money and tickets from automatic ticket machines at Underground stations, it was stated that metal washers, to be bought for threepence a dozen, after slight alteration could work sixpenny ticket issue machines. On a 4-ft. long string produced in court were over 1,200 washers, which according to the prosecution had been taken from ticket machines at London Transport stations over the preceding six months. The loss to the British Transport Commission was estimated at nearly £31.

Brennan's Railway

Louis Brennan, the Irish engineer inventor born 100 years ago, would certainly have applied his fertile imagination to the many problems of British Railways. He was awarded £120,000 by the Admiralty in 1885 for his dirigible torpedo, and his pet brain-child was the monorail transport system. He was convinced that all railways would ultimately have only one rail.

A distinguished audience witnessed his demonstration in 1909. The 40-ft. car weighed 20 tons and had a wheelbase of 20 ft. Two petrol engines drove electric generators, and the problem of balance had been solved by mounting two gyroscopes, each weighing ¼ ton. Thirty people were carried round a field in this remarkable vehicle, but technical hitches reduced its declared speed of 35 m.p.h. to 7 m.p.h. Brennan envisaged a car 150 ft. long travelling at twice the speed of contemporary rail transport. Because of its prohibitive cost his idea came to naught and the model carriage found its terminus in the Kensington Science Museum.—*From "The Manchester Guardian."*

Last of L.Y.R. Engine Class

The withdrawal of London Midland Region locomotive No. 52857 brings to an end the "31" class and also the former Lancashire & Yorkshire Railway 0-8-0 freight engines as a whole. Class "31" was the final development of L.Y.R. 0-8-0 freight tender engines. They were designed by George Hughes, and built at Horwich Works, the first appearing in 1912.

There were 155 locomotives in this class, 115 being new engines, and the remainder conversions of 40 of the non-superheated Class "30" 0-8-0's to superheated engines. These engines spent practically the whole of their working life on the L.Y.R. and were capable of hauling heavy loads of mineral traffic over the severe gradients of the Pennines. No. 52857 spent its last days working from Wigan.

Opening of Greenore Railway

The Dundalk, Newry & Greenore Railway, which was closed with little ceremony a few weeks ago, was inaugurated in quite a different manner on April 30, 1873.

In the archives of the British Transport Commission is a collection of yellowing newspaper cuttings describing the beginnings of the railway—an occasion honoured by the Lord Lieutenant of Ireland, the Army and the Navy, the clergy, and the chief magistrates of Dublin, Belfast, and Londonderry, as well as many other prominent citizens.

Some 800 guests sat down to lunch in the goods shed of the station at Greenore, their table talk interspersed between selections by the Band of the 6th Foot and the Band of the 4th Dragoon Guards. In the Lough were two of Her Majesty's gunboats, while the steamers of the company displayed lines of bunting from stem to stern. The station itself was decorated "with a great profusion of flags and evergreens." Order was preserved by the servants of the London & North Western Railway and English police brought over by the company.

Lunch began shortly before 1.30, and the last toast was drunk about 5 p.m., the guests having enjoyed a menu which occupies 13 lines of the *News-Letter*. All this took place in a transformed goods shed which seems to have impressed everyone as an appropriate setting. "There have been arenas dedicated to rout and revel which looked far less to the purpose," said the correspondent of the *Freeman's Journal.—From the "Belfast News-Letter."*

Horizontal Engine Preserved

A correspondent writes that the report in our January 18 issue that an old winding engine is to be preserved in York Railway Museum adds interest to a winding engine about to be restored and preserved at Huddersfield. This is a single-cylinder horizontal engine of unusual layout which formerly hauled standard-gauge railway wagons on the private siding belonging to the Fieldhouse Brickworks of the Leeds Fireclay Company, at Huddersfield.

The engine, built about 1850 and one of the oldest horizontal engines in existence, possesses a four-spoke flywheel 8 ft. in diameter. It is designed with the cylinder working away from the crankshaft, to which it is joined by a double return connecting rod, similar to that on early table engines. This interesting relic is to be preserved in the grounds of the Tolson Memorial Museum, Huddersfield, through the generosity of the Leeds Fireclay Company in giving it and Thomas Broadbent & Sons Limited, engineers, Huddersfield, in restoring it.

Rustic Lament

They've closed a railway station,
Down in the countryside,
It was a bit of England
And something dear has died.
There's moss upon the platform
There's rust upon the rails
And nothing but an echo
Where once the milk and mails
Came in and out twice daily
And everybody knew,
Long, long before she got there,
The old branch train was due.

The little railway station
Maybe has had its day,
And, like its many users,
It cannot pay its way,
But still it lives in memory
And those of us who roam
Out on the world's horizons
Still picture it as home.
How we shall miss the branch train,
Its artless, friendly fuss,
When we come home in future
By coach or country bus!

It took the folks to market,
It took the kids to school,
It carried saint and sinner,
Philosopher and fool.
It brought the evening papers,
With their little bits of news,
And gave the village gossips
A chance to air their views.
Now, down there in the darkness,
Only ghosts and memories meet;
They've closed the dear old station
And a heart has ceased to beat.

A. B.

London Midland Region locomotive No. 52857 recently withdrawn from service

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

NEW ZEALAND

Railways Lack Trained Staff

The General Manager has announced curtailment of passenger trains from February 4 to allow train crews to be released to work goods trains. The shortage of trained staff is serious and the restriction on passenger travel is likely to last for some time. Main line expresses will still run, but there will be drastic cuts in suburban and provincial services.

The Department is endeavouring to meet the situation by employing temporary staff, but this will not relieve the shortage of trained engine crews. It is likely that the assistance of the Immigration Department will be asked to adopt both a short-term and long-term policy for the provision of essential workers for the railways from overseas.

SOUTH AFRICA

Finances

The closing of the accounts for September, 1951, produced a surplus of £645,327 for all services. The corresponding month of last year had a surplus of £602,299. For the services taken individually, the results were: railways, £498,851 surplus; harbours, £189,005 surplus; steamships, £13,403 surplus; and airways, £44,263 surplus. The aerodromes were operated at a loss of £934 for September. The accumulated surplus for the period January to September, 1951, amounts to £5,726,314, of which £5,079,726 came from railway and £1,339,511 from harbour working.

In 1949, the administration launched a vigorous campaign to reduce expenditure. The results so far show savings in recurring expenditure of £1,454,319 annually, and £476,790 has been saved on non-recurring expenditure up to the end of August. These effects of the economy drive, with the reorganisation of train services resulting in more intensive use of tractive power and the haulage of heavier loads, enabled the railways to show a surplus of £8,470,323 for 1950-51.

Since the financial year 1944-45, there had been a series of deficits with a single exception, 1946-47, when a small surplus of £140,716 marked the close of the year. It is expected that the close of the present financial year on March 31 will reflect a surplus of about £6,000,000; this will provide an opportunity for building up reserve funds which have been heavily drawn on in recent years. During the period January to August, 1951, goods traffic carried amounted to 42,144,000 tons, and passenger journeys numbered 161,030,825.

The improvement in operating methods is shown by the fact that, while the total tonnage of goods hauled increased from 49,197,948 in 1946-47, to 62,133,704 in 1950-51, an advance of 26·3 per cent., locomotive power available increased by only 9·09 per cent. during the same period, and train mileage by only 14·2 per cent.

CANADA

Rate Increase Insufficient

The general freight rate increase of 4½ per cent. accorded to the railways is "not enough," Mr. Donald Gordon, President of the Canadian National Railways, has stated.

Mr. Gordon said he thought, without an examination of the Commissioners' written judgment, that the Board's order could be expected to yield Canadian National Railways $10,000,000 or $11,000,000 annually. It seemed obvious that less had been received than requested, and as the C.N.R. application was based only on requirements, the general 4½ per cent. increase was insufficient.

FRANCE

S.N.C.F. Lottery Bonds Success

December 31 was the closing date for subscriptions towards the lottery bond loan issued by the French National Railways, mentioned in our December 21 issue. Subscriptions have totalled fr. 7,000 million (approximately £7,142,800), enabling the lottery to include 189,000,000 km. (117,370,000 miles) of free travel on the railways.

Dijon-Chalon Electrification

Electrification from Dijon to Chalon-sur-Saône has been completed. An electric train of 450 *tonnes* was run for the first time from Dijon to Chalon on January 17 and averaged 60 m.p.h. The date for the official opening of the section to traffic was fixed for January 22. Electrification between Chalon and Lyons is expected to be completed and the entire line from Paris to Lyons opened to electric traffic by June or July. The journey from Paris to Lyons, 318 miles, is timed to take 4 hr. 50 min., at an average speed of about 66 m.p.h.

IRELAND

Wage Claims

The Labour Court has issued recommendations on its investigation of a dispute between the Irish Transport & General Workers Union and the G.N.R.(I.) concerning rates of pay of 67 workers in the conciliation grades employed at Dundalk Station.

The Court stated that the Union's claim was clearly one which involved wide and complex issues, affecting the wage systems of both C.I.E. and the G.N.R.(I.). A like claim made by a union which is party to the scheme of negotiating machinery would be investigated in the ordinary course by the Irish Railways Wages Board, the appropriate body for the purpose under the provisions of the scheme.

The Court was informed at the hearing that the I.T.G.W.A., which was not a participating body to the scheme when its claim was made, had since applied for membership, and that its application had been accepted by the participating bodies.

The Court presumed that the Union would now submit its claim to the Board, and recommended this course to the Union for adoption.

Transport Tribunal Appointed

The Government of the Republic has appointed a five-member transport tribunal, which is to hold office for five years, to hear views on proposals by Coras Iompair Eireann to close branch railways and canals. The tribunal may also be asked by Mr. Sean Lemass, Minister for Industry & Commerce, to advise him on matters relating to transport services.

The chairman of the tribunal is Mr. James P. Beddy, Chairman of the Industrial Development Authority and a director of the Industrial Credit Co. Ltd. He has served on many Government commissions and inquiries. The other members are: Mr. Walter Beirne, President of the Congress of Irish Trade Unions; Mr. James Boylan, company director; Mr. Michael K. O'Doherty, General Manager of the Irish Tourist Board; and Mr. Joseph Rice, chairman of County Kilkenny Committee of Agriculture.

Wage Increase for Rail Supervisors

The Joint Industrial Council at a sitting in Dublin last week recommended an increase of 7½ per cent. from October 1 last in the salaries of rail operative supervisory staff of C.I.E. The Transport & Salaried Staffs Association had asked the Council to recommend an increase of 20 per cent. for the 147 supervisors concerned.

A further application brought by the T.S.S.A. was that where the hours of duty of clerical staff in Dublin, Cork, Limerick, and Waterford were more than 39 hours a week, they should be reduced to that figure. On the suggestion of the Chairman of the Council, the matter was adjourned for it to be resolved by direct negotiation between representatives of C.I.E. and the Association. The chairman said that the Board of C.I.E. felt this was a matter which might be resolved by both sides.

It was stated that out of the 900 clerks employed in Dublin all but 136 already worked less than 39 hours a week, and, in effect, less than one-sixth of the clerical staff in Dublin was affected by the application.

Marshalling Yard Improvements in the Burntisland District, Scottish Region

Expansion of facilities at Oakley and Kelty to cater for coalfield development

BY 1965, the annual output of coal from the Fife and Clackmannan fields, it is estimated, will be 4,000,000 tons more than in 1950. To meet the expected increase the Railway Executive decided in 1948 to proceed with the first stage of marshalling yard development in the district which earlier had engaged the attention of the L.N.E.R. This decision involved the expansion of the former small mineral marshalling yards at Oakley and Kelty.

To determine the extent to which enlargement and modernisation were desirable and necessary, the L.N.E.R., after consultation with the Scottish Division of the National Coal Board on future coalfield developments in the area, undertook a detailed survey of the marshalling yard facilities in the Burntisland district.

Pre-War Traffic Flow

Until 1939 approximately half of the coal produced in the Burntisland district was exported through the East Coast ports of Methil and Burntisland; the remainder was distributed by rail to industrial and household consumers in North, East and West Scotland.

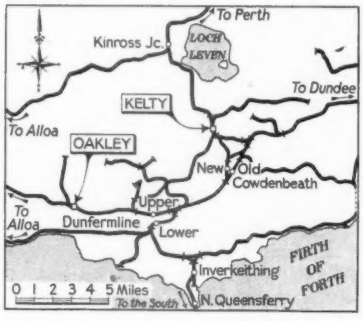
The large amount of shipment coal made it possible to work train loads from pit to port direct without assembling the traffic in marshalling yards. The traffic was not normally released to the port until the ships were available, or in sight, and it was therefore unnecessary to provide standage facilities intermediately, as the port facilities were normally adequate to meet all contingencies.

During the war the total of shipment coal fell, principally because of the reduced output from the collieries and increased industrial consumption in Scotland. Since the war, shipment of coal through Methil and Burntisland has not approached the former high level; in consequence, despite decreased production compared with the pre-war output, the traffic to be worked throughout by rail to destination has continued to increase.

The changed conditions—decreased shipment traffic and increased throughout rail haulage—impose considerable strain on the existing marshalling yards in the Burntisland district, and the substantial increase in coal production expected in future by the National Coal Board will make demands which could not adequately be met without extension of facilities.

Development at Oakley

Oakley Yard, between Stirling and Dunfermline, was constructed to deal mainly with the output from Comrie Colliery, developed by the Fife Coal Company and still the most up-to-date in Scotland. The increasing flow of coal traffic from East to West of Scotland has made extra demands on the marshalling yard facilities at Oakley. This change, and the expected increase in production in the immediate area, led to the decision to provide the following additional facilities: four through reception and departure lines (on the north side of the Dunfermline-Stirling main line); head shunt; ashpit, and coaling and watering facilities; new signalbox; and new office and messroom accommodation.



Map showing position of Oakley and Kelty yards in relation to approach lines

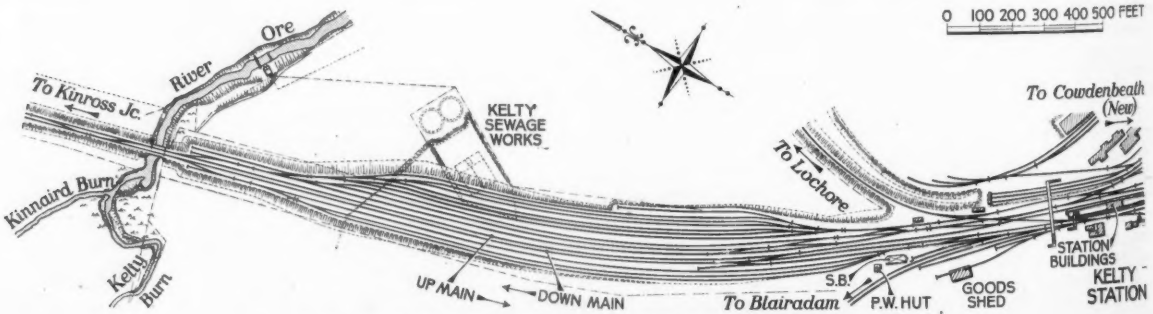
The earthwork, now almost complete, has involved the excavation and tipping of some 40,000 cu. yd. of material to form embankment. The new head shunt has necessitated the construction of a bridge across the public road; this work has been completed. Contracts have been let for the construction of a signalbox and the coaling and ash-handling facilities, which have been begun. The laying of the permanent way will be put in hand shortly.

A 55-lever mechanical interlocking frame in the new box will control, in addition to the apparatus now worked from the old signalbox, six colour-light signals on the main running lines and another colour-light signal for train movements from the new reception sidings to the up line. Seven pairs of electrically-operated points will control the entrance to and exit from the new reception lines on the east side. The new connections at the west end will be mechanically operated with semaphore signals; ten new semaphore signals and five track circuits will be provided to control movements to and from the new sidings.

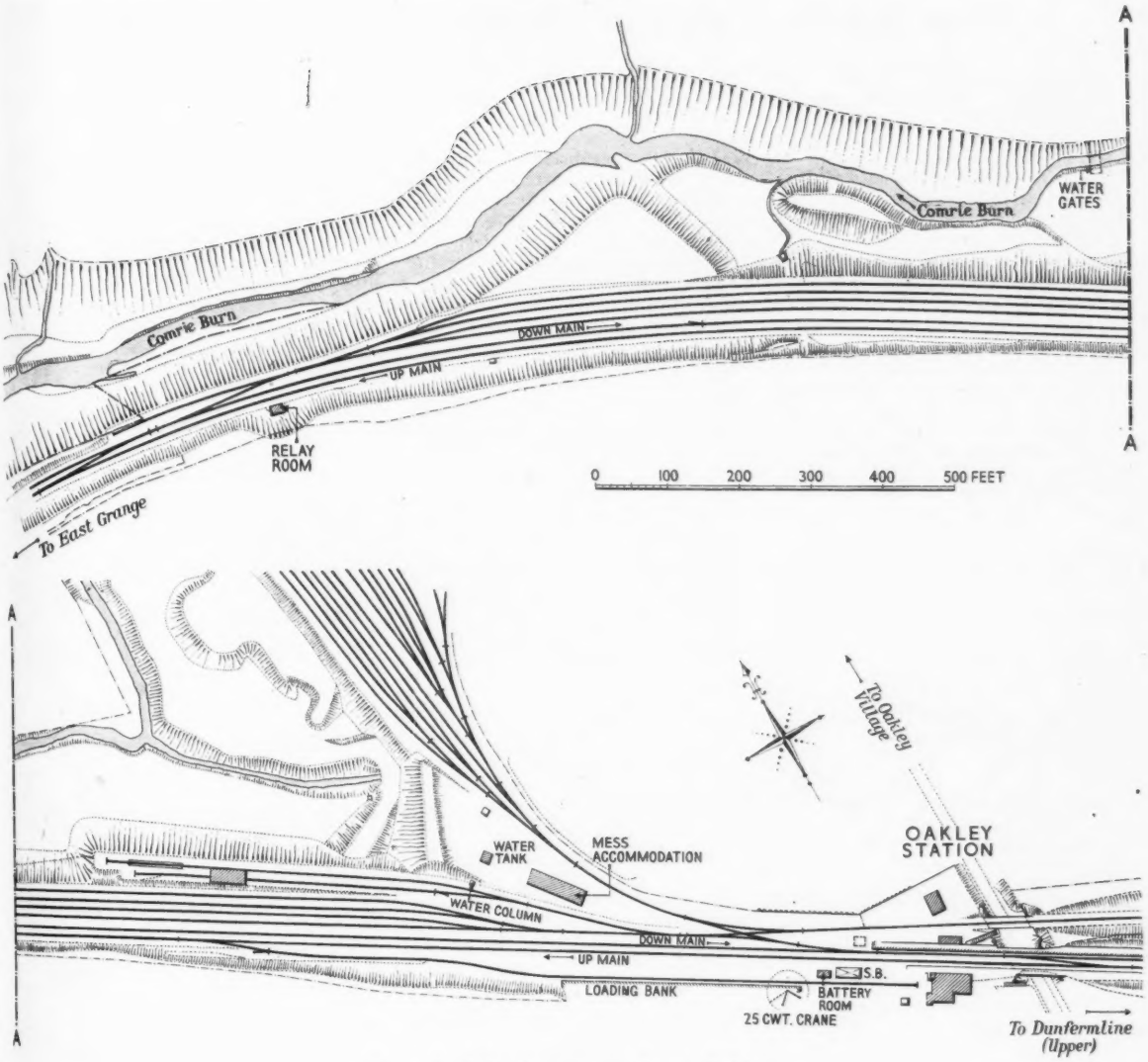
It is intended that the four reception and departure lines should be used for incoming trains of empty wagons, the temporary standage of marshalled loads awaiting despatch and, where necessary, the refuge of trains using the Stirling-Dunfermline main line. The new head shunt will make it possible to marshal trains without occupying the main line as in the past.

These works are the first stage of the developments contemplated at Oakley. In later stages additional sorting sidings will be added, if necessary, and a 70 ft. turntable is to be provided to obviate engines proceeding light to Dunfermline to turn, after bringing in loads of empty mineral wagons, mainly from West Scotland, and before departing with return loads of coal.

The comparable developments at Kelty marshalling yards, on the main line between Edinburgh and Perth, provide for: extension of the existing nine dead-end



Layout at Kelty after completion of first stage of expansion



Stage I of development works at Oakley

sidings on the east side of the line; and the three dead-end sidings on the west side of the line to increase their standage capacity, and also their conversion into through sidings; and a new signalbox.

The permanent way is almost complete and is in use with temporary signalling. This work has involved, in the first instance, the construction by the County Council of new sewage works to replace the former sewage works, which were on the site of the extended sidings. Some 90,000 cu. yd. of materials have been tipped to embankment and 5,700 linear yd. of permanent way have been laid. A new signalbox is under construction and, as further coal seams under the site may be worked, it is of steel construction, capable of being raised when necessary.

The new 120-lever mechanical interlocking frame will operate all the points and signals at present operated from the old signalbox. In addition, fifteen pairs of electrically-operated points, six colour-light signals and twenty semaphore signals will be provided to operate the new and extended accommodation. Electric lighting will be installed throughout at both Oakley and Kelty.

SCRAP DRIVE BY U.S.A. FIRM.—The American Car & Foundry Company has collected 19,883 gross tons of steel scrap from its twelve plants during an intensive drive which started a year ago. Realising the shortage of scrap in December, 1950, the company started a campaign next month to clean up its shops, and started disposing of all scrap machinery, dies, and other loose scrap around the plants. A special representative was appointed to inspect the plants and make a full survey of obsolete industrial equipment which could be scrapped. Even individual A.C.F. workmen served as scrap detectives in uncovering "dormant" material from within the various A.C.F. shops.

STEEL COMPANY OF WALES, LIMITED.—Group trading profits of the Steel Company of Wales Limited for the year ended September 29 last were £1,584,925 higher at £3,967,400 and reflected not only the satisfactory operations at the works taken over from the founder companies but also the coming into production of further sections of the development scheme. Substantial profits were again realised in the export markets. As foreseen last year, the restriction in availability of raw materials has begun to limit the operations at all the plants, the outputs from which are currently being restricted for this reason. This year the profits included about £600,000 from appreciation of stock values compared with £50,000 in the previous year. At September 29, 1951, the expenditure sanctioned for the development scheme amounted to approximately £68 million, and to date £57,028,922 of this had been incurred. Further sections were put into operation during the year.

First British Main-Line Freight Electrification—1

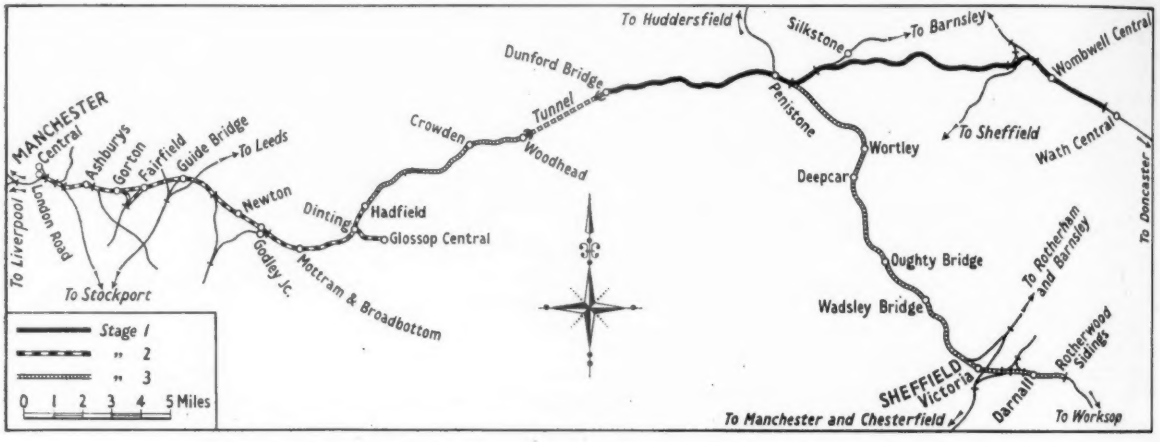
Electric traction inaugurated between Wath and Dunford Bridge, Yorkshire, on completion of first stage of Manchester-Sheffield project

ON February 4 electric traction between Wath-on-Dearne and Dunford Bridge, 18 miles 45 ch., was officially inaugurated, and all freight traffic between these points is now hauled by electric locomotives. The opening marked the completion of Stage I of the project to electrify the line from Manchester London Road to Sheffield (Rotherwood Sidings) with the branches to Glossop, and Wath, which was approved by the directors of the former L.N.E.R. in 1936. It was then estimated that electrification would considerably increase the capacity of the main line, particularly through Woodhead Tunnel, where an increase of 25 per cent. in the number of trains operated was then estimated. All classes of traffic would be electrically hauled and it would be the first British example of a completely electrified railway service.

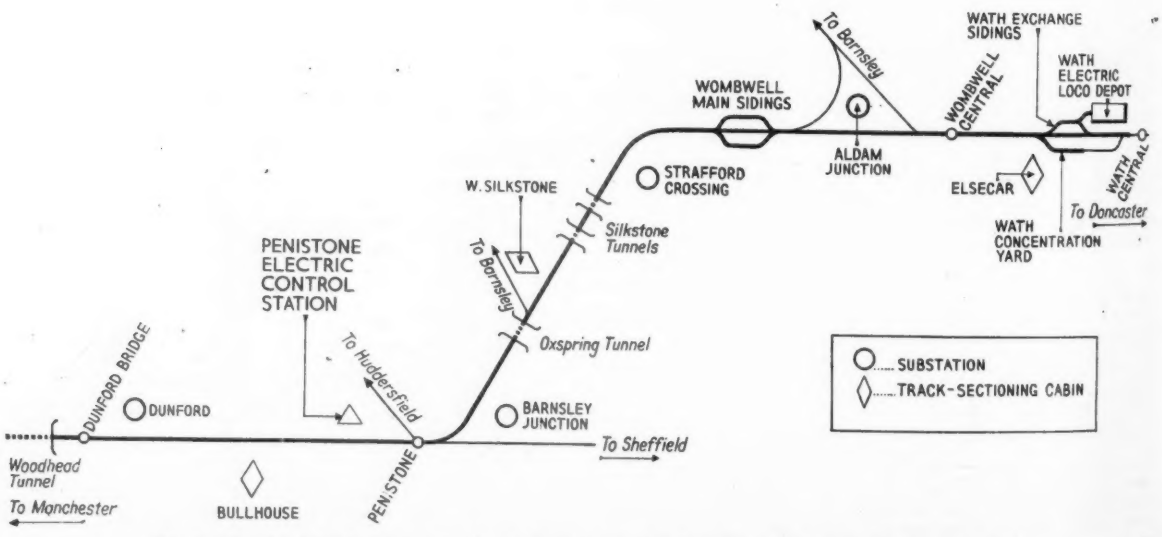
Preliminary work was well in hand in 1939, when the war caused it to be suspended. Structures for carrying the overhead wires had been erected for some miles, work had begun on the new motive power depot at Darnall, and orders had been placed for the rolling stock, locomotives, substation equipment, cables, and overhead line equipment. It was not until the late summer of 1947 that the Minister of Transport sanctioned the resumption of work covering 68 miles of route and a total of 300 miles of track.

The traffic passing between Wath and Barnsley Junction (just east of Penistone) is entirely freight. At Barnsley Junction the line joins the Marylebone-Manchester main line and thence to Dunford Bridge (which lies at the eastern end of the Woodhead Tunnel where a new tunnel is being driven parallel to the old). Electrically-hauled freight trains from Wath share the same tracks as passenger and freight trains between Sheffield and Manchester which will not be hauled electrically until the remaining stages of the project are completed.

South Yorkshire coal for despatch over the Woodhead line is worked into Wath yard. Between 33 and 40 trains



Map showing the Manchester—Sheffield electrification scheme by stages



Wath—Dunford Bridge section, showing position of substations and track-sectioning cabins

Penistone electrical control station, with G.E.C. fluorescent lighting

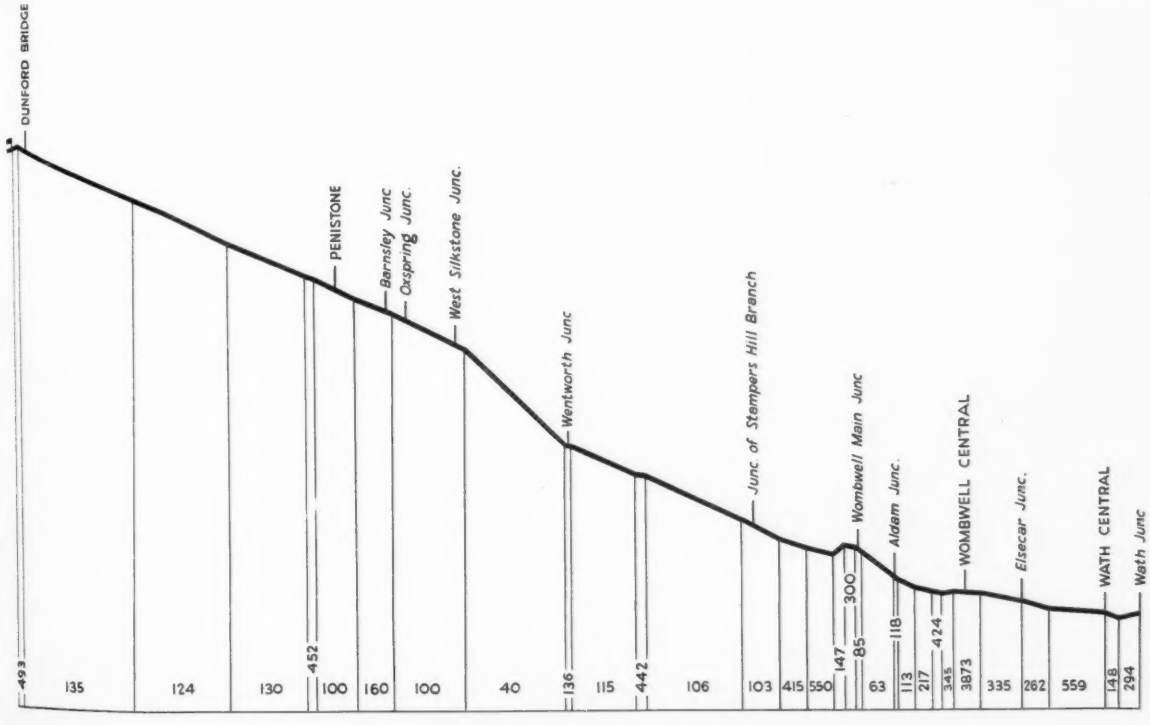
are made up at Wath daily for that route, and after being hauled over the Pennines run into Mottram Yard where the wagons are re-marshalled according to destination in the Manchester area, or other parts of the North-West. There are some 15 empty trains daily between Dunford Bridge and Wath.

The severity of the route may be judged from the accompanying gradient profile. The worst gradient is one of 1 in 40 for over two miles between Wentworth and West Silkstone Junction. It was to assist coal trains up this incline that the L.N.E.R. introduced in 1925 the 2-8-0 × 0-8-2 Beyer-Garratt locomotive, now working on the Lickey Incline. With steam working the schedule between Wath and Dunford Bridge was 142 min. for an 850-ton train (49 "heavies" at 17·3 tons each).

The speed up the Wentworth bank was 12-15 m.p.h., with four locomotives, one hauling and three banking (when the Beyer-Garratt was not available). Now the whole journey is accomplished in 66 min., with a speed of 30 m.p.h. up the 1 in 40 with two electric locomotives, one hauling, one banking. Class "C" trains (express goods over 50 per cent. braked) take 45 min. compared with 86 min. with steam haulage. In the reverse direction the timings vary between 36 min. (63 min. with steam) for a Class "C" train and 46 min. (115 min.).

Electrical Works

Power is supplied from the British Electricity Authority substation at Aldham and distributed at 33 k.V. by cables along the tracks inter-connecting the Railway Executive substations at Aldam Junction, Strafford Crossing, Barnsley Junction and Dunford. Each substation contains E.H.T. outdoor switchgear for controlling the power supply between distribution feeders and busbars and between busbars and the outdoor step-down transformers associated with the rectifiers. Power for the completed electrification will be taken from three sources—Aldam, Sheffield



Gradient profile of Wath—Dunford Bridge section

Up freight train at Barnsley Junction, east of Penistone, double-headed by Bo-Bo locomotives

and Manchester. Of these, only the Aldam power supply is at present available. That at Sheffield will be available in six months time and the Manchester supply will become available later this year west of the tunnel.

Mercury-arc rectifiers are used for the conversion of the a.c. power to 1,500 volts d.c. for the overhead conductor system. Three of the substations each contain two 12-anode steel cylinder rectifiers; the fourth, Barnsley Junction is equipped with three units. The rectifiers are rated at 2,500 kW. each and are capable of carrying overloads up to 10,000 kW. each. The total installed capacity of this section of the line is 22,500 kW. The substations are equipped with control cubicles containing protective relays, local control switches and supervisory gear for remote control, and with d.c. smoothing equipment and auxiliaries. The 1,500 V. d.c. supply to the overhead lines is switched and protected by high speed circuit breakers, and track sectioning cabins also containing high-speed circuit breakers are situated between most substations to limit voltage drops and enable faults to be cleared with certainty. The substations at Strafford Crossing and Barnsley Junction are also equipped with resistance banks with electronic control capable of absorbing 900 kW. of power from locomotives using regenerative braking, in the event of there being no load on the system to absorb the regenerated current.

Normally the substations and track sectioning cabins are unattended and are remote supervisorily-controlled from the control station at Penistone over pilot cables routed alongside the tracks. The control equipment consists of an indicating master control panel which may be switched as required to any substation or track sectioning cabin for operational purposes and indication of the position of the equipment therein. Remote metering of E.H.T. and d.c. busbar voltages and of rectifier output is also available at the control station.

As already mentioned, the substations are linked by 33 kV. and pilot cables. These are of the three-core screened, single lead, single wire armoured and served type in the case of 33 kV. power cables, and of seven- and four- star quad types in the case of pilot cables.

The cable laying was carried out mainly on Sundays, when the traffic is lighter. The drums were conveyed by rail to Penistone, and there transferred by crane to a train of cable wagons. From these it was paid out along the line for lifting on to the supports during the week. Each drum carried approximately 220 yd. of cable.

The cables are normally carried on cast-iron hangers mounted on concrete posts adjacent to the track, with the addition of creosoted wood battens to give additional support to pilot cables. Where obstructions are met the cables run in precast concrete trough laid with the lids at surface level. Cables cross the tracks by means of asbestos cement ducts laid in concrete at a depth of 3 ft. 6 in. below sleeper level.

The section between West Silkstone Junction and Wath is subject to subsidence caused by underground colliery workings, and special precautions have had to be taken in installing the cable route in this area. As a result of two years' observation on an experimental cable route, special long, reinforced-concrete posts have been installed, and the cables are carried in asbestos covered steel troughing mounted on them. Concrete cable bridges are inserted in the troughing midway between the post positions. Arrangements are also made for slack cable to provide for subsidence of the track crossings.

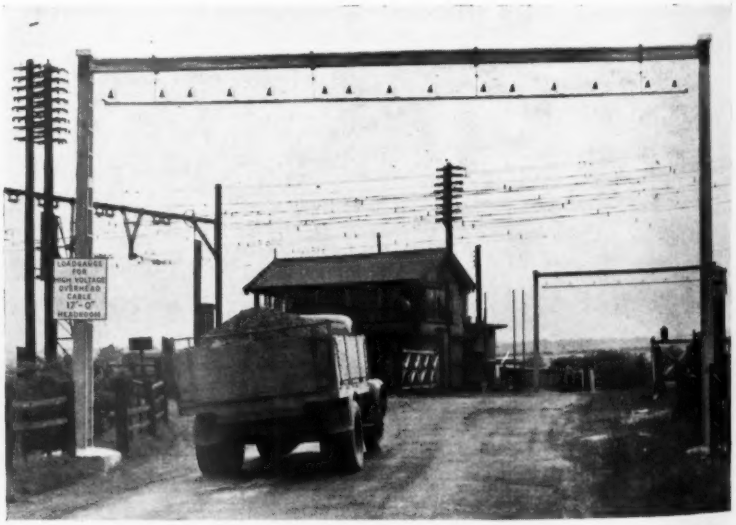
The longest continuous run of 33 kV. feeder cable installed on this stage is the 583-yard length laid through Oxspring Tunnel, where restricted clearance did not allow a straight through joint to be made.

Barrier joints are installed in the 33 kV. cable where it traverses the 1 in 40 gradient of the Worsborough Bank.

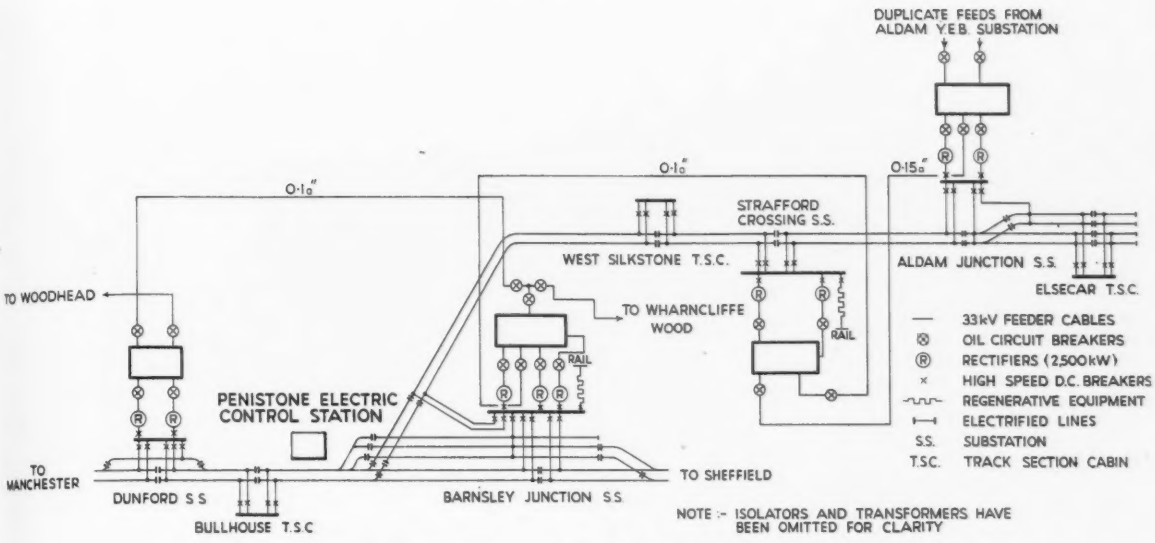
Overhead Line Equipment

The overhead equipment is of the compound catenary type giving a total copper equivalent section of 0·75 sq. in. and is designed to operate at a potential of 1,500 volts d.c.

Most of the route runs through areas where ground subsidence is liable to result from colliery workings. This presented the designers with many problems. When subsidence occurs, the tracks are packed up by the railway engineers to maintain correct grading, and therefore provision has to be made



Level crossing at Elsecar, showing load gauge over road which indicates headroom given by overhead line



Power distribution system for Wath—Dunford Bridge electrification

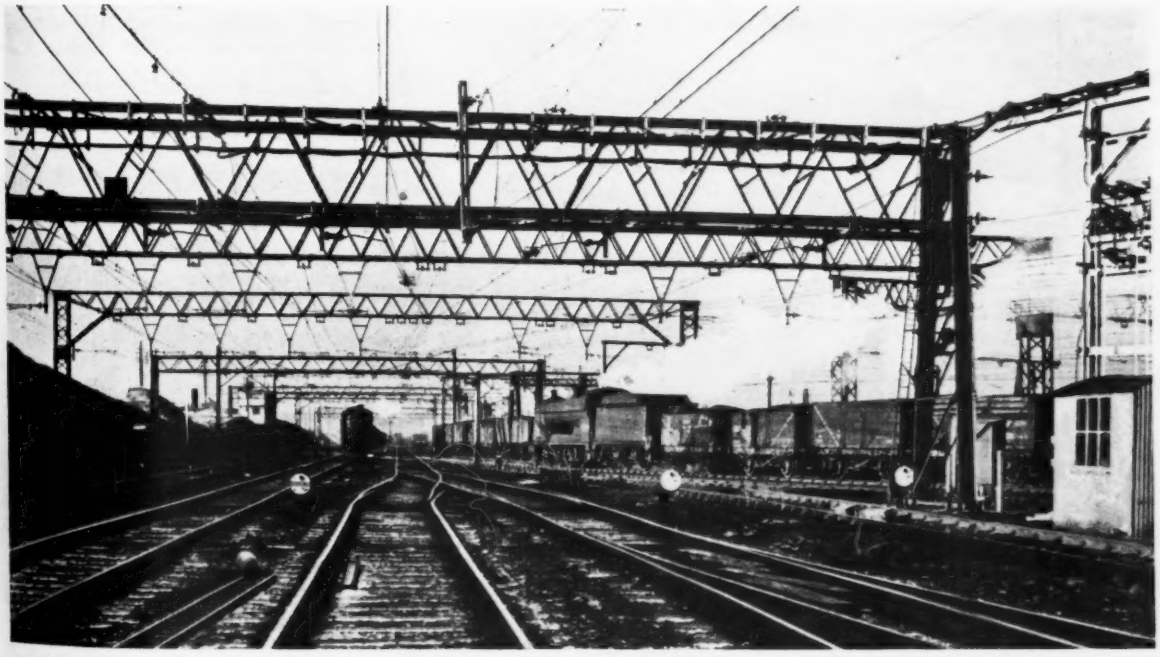
in the design of the structures to maintain the height of the conductor wire relative to the tracks. For this purpose, all masts, bridges, and cross-spans in subsidence areas have been made adjustable, and the foundations and structures have been designed to withstand the additional stresses which will occur when the equipments are raised.

Where the number of tracks does not exceed four, steel portals constructed from broad flange beams are used to support the equipment. Where there are more than four tracks, lattice-type structures are generally used, except in subsidence areas where advantage has been taken of the more easily adjusted cross-track catenary (head span) construction.

In tunnels, old rails curved to the form of the tunnel were inserted to hold the stringers carrying the overhead equipment.

The control room at the Penistone Electrical Control Station has been equipped with a fluorescent lighting scheme designed by the General Electric Co. Ltd. in collaboration with the railway authorities. Illumination of the control desk is provided by twenty 4 ft. 40 W. Osram Warm White lamps installed in sets of four above the five panels of a laylight, which is glazed with Morocco diffusing glass. Segments of white flashed opal glass are inserted in the panels to coincide with the ends of the lamps. The panels are hinged for access to the lamps and gear from below.

The illumination on the desk is approximately 34 lumens per sq. ft., which provides convenient conditions for manipulation of the control keys and observation of meters. Lighting in the vertical plane for a mimic diagram of the supply system and track layout is also provided by the laylight. The illumination level on the panel is approximately 15 lumens per sq. ft., which is adequate



Barnsley Junction, Penistone, showing Sheffield—Manchester main line in foreground and line from Wath on right

Cantilever structures, Wombwell Main Junction sidings

for observation of the diagram and preserves contrast between the background and the indicator lamps showing the condition of switchgear at the sub-stations.

The general lighting is entirely indirect and is provided by thirty-four 4 ft. 40 W. lamps in a continuous cornice, 122 ft. in length, round all four sides of the room. In order that the illumination may be continuous, the lamps are arranged with their ends overlapping. This arrangement, combined with the placing of the lamps at a slight angle to the direction of the cornice so that the centre of each is at the same distance from the wall, results in lighting with no perceptible variations of intensity. The average level of general illumination in the room is 15 lumens per sq. ft.

(To be continued)

NORTH EASTERN REGION STATION CLOSED.—The passenger train service at Upper Batley in the North Eastern Region was closed on February 4. Parcels traffic is being dealt with at Batley Station from which point a collection and delivery service is operated by British Railways road vehicles. An alternative bus service for passengers is provided.

WITHDRAWAL OF BURY-HOLCOMBE BROOK PASSENGER SERVICE.—The London Midland Region announces that the passenger train service between Bury Bolton Street and Holcombe Brook will be withdrawn from May 5. The line was electrified experimentally by the Lancashire & Yorkshire Railway in 1913 on the 3,600 V. d.c. system, using overhead conductors, but converted to 1,200 V. d.c. third rail system in 1916 to conform to the Manchester-Bury electrification. A push-pull steam train replaced the electric trains on March 25 last.

THE ENGINEERING CENTRE.—In response to many requests for office facilities the Engineering Centre in Glasgow has arranged accommodation for a limited number of agents or representatives of firms. An area of approximately 1,000 sq. ft. is being furnished with tables, desks, private lockers, and telephone booths, and the total number of participants will be limited to about 20. The facilities include the use of telephone numbers at the Centre and an address for the receipt of mail and messages and so on. Letter typing can be undertaken either from copy or by dictation and the catalogue library and information service may be used. This development is the latest addition made by the Engineering Centre to the many services it offers to the engineering industry.

B.E.A. EFFORTS TO ATTRACT VISITORS.—Lord Douglas of Kirtleside, Chairman, British European Airways, said recently that, although the reduction of the foreign travel allowance to £25 was bound to affect their services, he did not think it would cause grave loss. The corporation itself could do a great deal to mitigate the effect of the reduction, and proposed to intensify its sales effort to encourage more foreign nationals to come to Britain. A special foreign sales department has been set up. B.E.A. considers that air services to the Channel Islands will have to be augmented this year because the islands are in the sterling area, and travellers can live there without spending foreign currency.

CLYDE COAST STEAMER SERVICES.—Alterations in the Clyde Coast steamer services in force from February 4 include sailing at 11.40 a.m. (Monday to Friday) from Wemyss Bay to Rothesay instead of 11.45 a.m., due Rothesay 12.10 p.m., leaving there at 12.25 p.m., calling Largs 1 p.m., and arriving Millport 1.25 p.m., thus providing a midday service to Millport; and new services as follow : 1.35 p.m. (Monday to Friday) from Millport, calling Largs 2 p.m., and due Rothesay 2.35 p.m.; 4.30 p.m. (Saturdays only) from Rothesay, calling Innellan 5 p.m., due Wemyss Bay 5.15 p.m.; 5.35 p.m. (Saturdays only) from Wemyss Bay, due Rothesay 6.5 p.m.; 6.15 p.m. (Saturdays only) Rothesay to Wemyss Bay; 6.30 a.m. (Mondays only) Millport Old Pier to Fairlie Pier, thence to Rothesay; 1.55 p.m. (Saturdays only) Millport Old Pier to Largs; 2.50 p.m. (Saturdays only) Fairlie Pier to Millport Keppel and Brodick; and 4.30 p.m. (Saturdays only) Brodick, calling Millport Old Pier 5.35 p.m., to Fairlie Pier.

NEW TALGO SERVICE.—It is reported from Madrid that a Talgo train, similar to that running between Madrid and the French frontier, is to operate between Madrid and Valencia.

AUSTRIAN FARE REDUCTION.—In connection with the Vienna Spring Fair (March 9-16), the Austrian Federal Railways are to grant a 25 per cent. reduction in fares on all lines and for all classes for the period March 4-21. The reduction will be given on presentation of the pass to the Fair, if the return journey is also made by rail. The reduction will also apply to all long-distance bus routes into Vienna under the control of the Austrian State Railways, and to postal buses.

INTERNATIONAL MACHINE TOOL EXHIBITION.—Advance information has been made available concerning an International Machine Tool Exhibition, to be held in London from September 17 to October 4, under the auspices of the Machine Tool Trades Association of Great Britain. The whole of the exhibition space available at Olympia of 250,000 sq. ft. has been let. Special facilities will be provided for the convenience of overseas visitors, and 20,000 copies of an advance edition of the exhibition catalogue have already been mailed to prospective visitors from all parts of the world.

Preventing the Formation of Ice on Conductor Rails

De-icing baths used by London Transport on open sections of line

Meteorological "station," at Barons Court, showing dummy length of conductor rail and arrangement of recording equipment

SINCE the war the London Transport Executive has given increasing attention to delays on the open sections of its railways caused by the formation of ice on conductor rails. Originally, sleet locomotives—electric locomotives equipped with ice-crushers, wire-brushes and anti-freeze sprays—were used to remove the ice, but recent research has concentrated more on prevention than cure.

When in 1947 it was proposed to install conductor rail de-icing baths (from which anti-freeze solution is spread along the rail by train collector shoes passing over sprung rollers) one advantage expected was that sleet locomotives could be dispensed with, as it was visualised that during cold spells the baths would be operated continuously for days or even weeks at a time if necessary. Troubles arose from de-icing fluid splashing on to rolling stock, making the continuous use of baths undesirable, and day-to-day working was adopted according to weather forecasts received from the Meteorological Office every afternoon.

A day-to-day system makes it necessary to hold staff available for switching in the baths; furthermore, whenever icing conditions are forecast, it is necessary to switch in at least three "traffic hours" in advance to allow time for an adequate layer of fluid to be spread along the conductor rails. In practice, therefore, it is still necessary to hold sleet locomotives in readiness in case the baths cannot be put into service in sufficient time, although, as far as possible, their use is restricted to non-traffic hours to avoid interference with normal operations.

These factors, and the recent considerable rise in the price of de-icing fluids, have made imperative the utmost economy in the application of de-icing measures without impairing the efficient operation of the services. One of the first aims is to avoid using sleet locomotives, but the practicability of using baths alone depends largely on the rate at which an adequate layer of fluid can be built up on the rail. Earlier experiments carried out on the Hainault-Woodford section of the Central Line with baths having non-sprung rollers showed that they could provide rapid cover. As a result, all baths on the Bakerloo Line between Finchley Road and Stanmore were similarly modified last winter. On these sections it was unnecessary last winter to call out the sleet locomotives, even during the January snows.

Differences in types of rolling stock on various lines make it unlikely that the use of baths alone would prove practicable all over the system. For instance, the motor control circuits of 1938-type tube stock (used on the Stanmore line) are fed from batteries, but on the pre-1938 type stock control current comes from the traction supply by one pair of collector shoes; it is obvious therefore that only one of these shoes need be isolated from the rail by a film of ice to affect all the motors on the train. The new surface line "R" stock should prove less prone to icing troubles than other stock, for in addition to independent motor control supplies it has a motor and set of collector shoes on each bogie. Therefore, unless the entire conductor rail is covered by ice, at least some of the motors will be able to operate and so prevent a train becoming immobilised.

Different types of rolling stock also have different types of positive shoes, either link or radial, and experiments are to be carried out this winter to determine the overall spread of fluid achieved by each type.

Thermostatically-Controlled Baths

Work has continued on the development of thermostatically-controlled baths, of which some were installed experimentally on the Epping branch last year. Although they were satisfactory on bench tests as well as in an experimental length of rail at Barons Court, it was found in service conditions that vibration switched them in at temperatures considerably higher than those at which they had been set to operate; a modified design is being developed. As rail temperatures may sometimes fall below freezing point without danger of icing, the widespread use of thermo-

Standard de-icing bath, with sprung rollers mounted in conductor rail

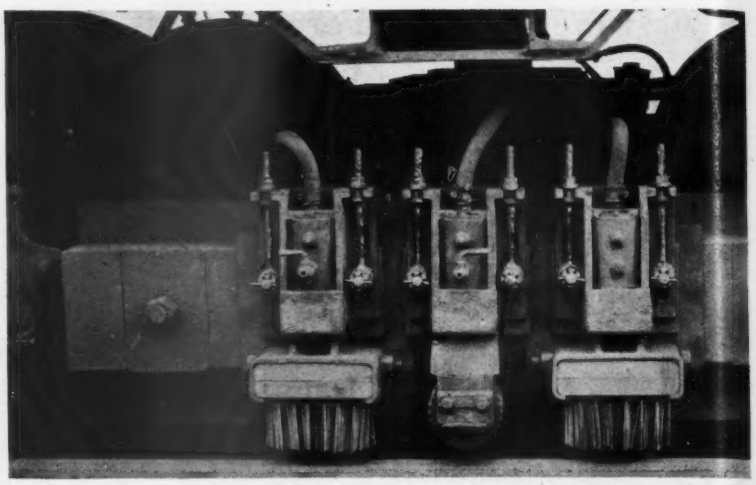
static control would be uneconomical. So far, no really satisfactory method of switching in automatically has been devised; mechanical switching by a lever below the train is impracticable because of the risk of fouling other track equipment, and the cost of an electric system, whether actuated from a train or from selected control points, would be high.

In sidings and depots the problem calls for different treatment, for the small amount of fluid that can be spread by the passage of a single train over the normal type of bath is inadequate to protect a complete stabling road. It is expected that an open trough-type both will allow a much greater rate of feed, and experiments

are being carried out with prototypes of this and a new spray-type bath.

At Barons Court a "meteorological station" comprising instruments for recording air temperatures and humidity and the rail and ground temperatures has been installed. Two more such "stations" were put into commission last autumn, one in a cutting north of Kingsbury and the other on an embankment south of Queensbury. Charts from all three have been passed to the Meteorological Office at Dunstable for study to determine the correlation between rail temperatures and atmospheric and ground conditions. It is hoped that as a result the weather forecasters will be able to predict rail rather than air temperatures in their "icing risk" forecasts; this will be of great assistance to the London Transport traffic controller in deciding whether or not to put de-icing precautions into effect.

During the cold months, forecasts of icing conditions are received each afternoon from the Meteorological Office in one of three categories—"strong risk," "risk" or "no risk." As a further aid to the traffic controller remote-reading dial thermometers are being connected to dummy lengths of rail outside the signal boxes at Hounslow West, Rickmansworth, Cockfosters, and Loughton so that the rail temperatures at these extremities of the system can be communicated to him at any time.



Close-up of wire brushes and ice crusher mounted on sleet locomotive

Locomotives for Costa Rica

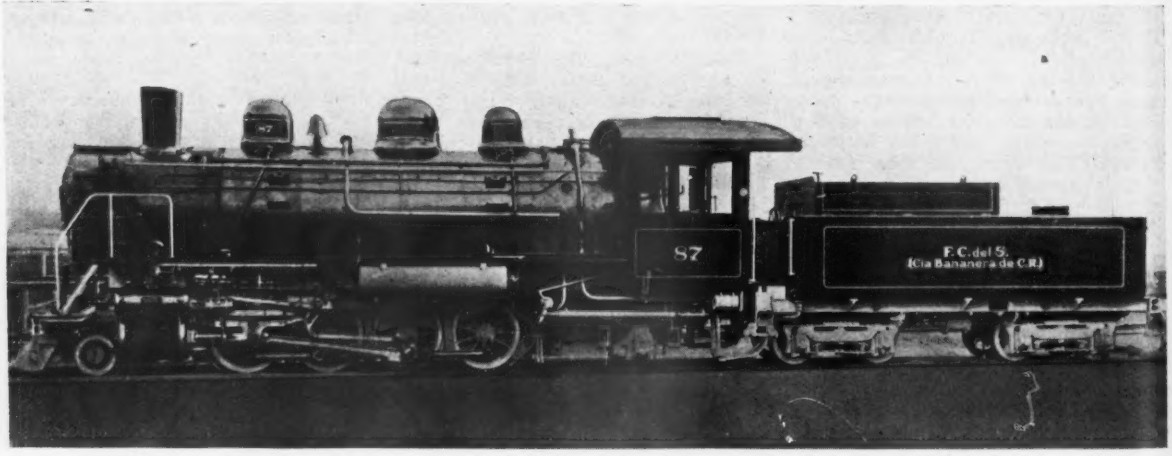
Large German-built design for fruit plantation lines

A BATCH of 3 ft. 6 in. gauge 2-8-2 locomotives recently shipped to Costa Rica from Germany was the first post-war delivery for export of the Fried. Krupp locomotive works. They were almost completed during the war, but shipment then was impossible.

The locomotives intended for service on the railways of the Cia. Bananera de Costa Rica, one of the cargo banana estate undertakings, are on generally conventional lines in design and dimensions, though to strict specification. They have two 19-in. by 22-in. cylinders, 44-in. wheels, 200-lb. boiler pressure, and a tractive effort of 25,575 lb. at 75 per cent. pressure. Coupled wheelbase is 12 ft., locomotive wheelbase 27 ft. 3 in., and engine and tender wheelbase 53 ft. 1 in. Leading and trailing locomotive axles are arranged in Bissel trucks with 4¼ in. play each side, enough, with the driving pair of wheels flangeless, to enable curves of 230 ft. radius to be traversed at slow speed.

Evaporative heating surface of the tubes, flues and firebox is 1,991 sq. ft., measured on the fireside as is usual in Continental practice. Grate area is 45 sq. ft., and the surface of the 35-element superheater is 570 sq. ft. The locomotive is oil fired; 2,100 Imp. gal. of oil are carried, with 2,900 Imp. gal. of water, in the 41-ton bogie tender. The maximum calculated i.h.p. is 1,050 at 27-28 m.p.h.

The maximum axle load is 13½ tons, adhesion weight 54 tons, locomotive weight 73 tons, and weight of engine and tender 114 tons fully laden. The highest speed allowed is 34 m.p.h. Fittings include an all-welded steel firebox, multiple-valve regulator, bar frames, grease-lubricated plain bronze axleboxes, and Westinghouse brakes.



New 2-8-2 locomotive for 3 ft. 6 in. gauge plantation railway in Costa Rica

RAILWAY NEWS SECTION

PERSONAL

Mr. Thomas Frederick Storey, C.B.E., Maormar, Cultra, Co. Down, has been co-opted a Director of the Great Northern Railway Company (Ireland), in place of the late Sir Milne Barbour, Bart.

Mr. Norman Powell, Divisonal Freight Controller, Manchester, London Midland Region, who, as recorded in our January 18 issue, has been appointed District Operating Superintendent, Rugby, began his railway career in 1910 as a junior clerk on the L.N.W.R. at New Street. Except for five years war service between 1914-19, in France and Salonika, Mr. Powell worked at stations in the Birmingham area until 1928, when he became District Inspector at Birmingham. He received similar appointments at Walsall in 1929, and Saltley in 1931. Five years later he went to Leicester as Assistant District Controller and in 1939 filled a similar position at Liverpool. He subsequently became Divisional Freight Controller, Manchester, in 1949.

Mr. Norman Powell

Appointed District Operating Superintendent, Rugby, L.M. Region

Mr. A. B. Mortimer, Divisional Police Superintendent, Kings Cross, British Transport Commission Police, has retired.

Mr. S. G. Monk, F.F.S., District Surveyor, Grimsby, Eastern Region, who, as recorded in our January 18 issue, has been appointed District Estate Surveyor, Preston, London Midland Region, began his railway career in the Goods Department of the Great Eastern Railway, and after holding various posts was transferred to the Land Agent's Department at Liverpool Street, in January, 1914. Mr. Monk joined the Forces in October, 1914, and after serving in Flanders throughout the war, with the 4th City of London Royal Fusiliers, he was demobilised in March, 1919, with the appointment of Staff Captain. He returned to the railway service, held various appointments in the Land Agent's Department, and became District Surveyor, Grimsby, in 1945.

The viscounty conferred on Sir John Anderson, G.C.B., G.C.S.I., G.C.I.E., F.R.S., in the New Year Honours has been gazetted by the name, style, and title of Viscount Waverley of Westdean in the County of Sussex.

Mr. César Tagliani, formerly Chief of the Traction Division, Argentine National Railway Board, who, as recorded in our November 30, 1951, issue has been appointed Chief of the Mechanical & Electrical Department, D. F. Sarmiento Railway, was born in 1912 and graduated as mechanical and electrical engineer in 1938 at the National University of La Plata. After studying at the Petroleum Institute, he joined the Production Section of the State Oilfields. Mr. Tagliani afterwards transferred to the National Railway Board as a Technical Inspector in workshops and running sheds of all the Argentine railways, as well as examining drivers and motormen. He subsequently was appointed Chief of the Traction Division, where he specialised in fuel problems. Mr. Tagliani is a Professor of the Railway School, and a Member of the Executive Committee of the Centre of Engineers, for which he is the delegate to the Standards Association. In 1940 he was Secretary of the Technical Committee for reorganisation of the Argentine Railways.

Mr. César Tagliani

Appointed Chief of Mechanical & Electrical Department, D.F. Sarmiento Railway, Argentina

Mr. L. H. Spiers has been elected a Director of G. D. Peters & Co. Ltd.

SCOTTISH REGION APPOINTMENTS

The following appointments are announced by the Scottish Region:—

Mr. J. K. Cumming, Assistant to District Commercial Superintendent, Edinburgh, to be Assistant District Commercial Superintendent, Edinburgh.

Mr. D. M. K. Reid, Senior Technical Assistant, District Engineer's Office, Glasgow (South), to be Assistant District Engineer, Aberdeen.

Mr. H. Gresham, Divisional Storekeeper, Cowlairs, to be Divisional Storekeeper, St. Rollox.

At a meeting of the Irish Railway Clearing House Committee held on January 31, Mr. J. B. Stephens was unanimously re-elected Chairman of the Committee for the year 1952.

The Minister of Transport has approved the appointment of Councillor T. W. Anthony, who is a representative of local authorities, to be a member of the Transport Users' Consultative Committee for the East Anglia Area, in place of the late Alderman S. C. Lawrence.

Mr. C. O. Jenkin-Jones, Assistant District Operating Superintendent, Glasgow, Scottish Region, who, as recorded in our February 1 issue, has been appointed District Operating Superintendent, Leeds Central, North Eastern Region, joined the L.N.E.R. as a traffic apprentice in 1938 and received special training in operating and commercial work in Scotland. Throughout the second world war he held a Supplementary Reserve Commission in the Transportation Branch of the Royal Engineers, and saw service in France with the B.E.F., in Persia and Iraq, and on the British Army Staff in Washington, D.C. Later he became Deputy Director of Transportation, British Army of the Rhine, with the acting rank of Colonel. Mr. Jenkin-Jones returned to the L.N.E.R., and in May, 1946, was appointed to the Works & General Section of the Chief General Manager's Office, Dorset Square, London; in November of the same year he became Assistant to the District Superintendent, Lincoln. He was promoted Assistant District Superintendent, Burntisland, in December, 1947, and Assistant District Operating Superintendent, Glasgow, in 1949.

Mr. C. O. Jenkin-Jones

Appointed District Operating Superintendent, Leeds Central, N.E. Region

Mr. T. Tandy, Assistant to Motive Power Superintendent, London Midland Region, British Railways, was recently presented with an antique clock and a pair of pipes on the occasion of his retirement, by F. W. Abraham, Motive Power Superintendent, London Midland

Mr. J. H. Glendinning
Appointed District Engineer, Peterborough, Eastern Region

Mr. N. S. Robinson
Appointed District Engineer, Barrow, London Midland Region

Mr. S. A. S. Smith
Appointed Locomotive Works Manager, Horwich, London Midland Region

Region, on behalf of the officers and staff of his department. Mr. Tandy joined the L.N.W.R. as a locomotive works apprentice at Crewe in 1908. His brother, Mr. H. Tandy, is District Commercial Superintendent, Leicester, London Midland Region.

Mr. J. H. Glendinning, M.C., A.M.I.C.E., B.Sc., District Engineer, Boston, Eastern Region, who, as recorded in our January 18 issue, has been appointed District Engineer, Peterborough, was educated at Campbell College, Belfast, and served in the Infantry in the 1914-18 war, after which he graduated in Civil Engineering in the Queen's University of Belfast in 1922. After serving for a few years in the office of an engineer and architect in private practice, he joined the L.N.E.R. in the Civil Engineer's Department in 1925. He was engaged on new works, including the opening out of Hattersley Tunnels, near Manchester, and was Resident Engineer on the widening between Gidea Park and Shenfield and new lines at Shenfield. In 1937 he was appointed Senior Assistant in the District Engineer's Office, Stratford, and soon afterwards as Assistant District Engineer, Kings Cross. During the last war he was actively engaged in A.R.P. and bomb damage repairs in Stratford and Kings Cross districts. In December, 1947, Mr. Glendinning was appointed District Engineer, Boston.

Mr. L. Harrison, Head of Canvassing & Development Section, District Goods Superintendent's Office, Sheffield, Eastern Region, who, as recorded in our December 21 issue, has been appointed Assistant to District Goods Superintendent (Mineral), Sheffield, was educated at the British School, Doncaster, and joined the Great Central Railway at Doncaster in 1905. He served with the Forces from November, 1916, to July, 1917, and in July, 1918, was transferred to the District Goods Manager's Office, Sheffield. He moved to the District Traffic Manager's Office at Doncaster in 1919 and returned to his former office in Sheffield in 1924. Mr. Harrison became Chief Canvasser in the District Goods Manager's Office at Sheffield in 1942 and was appointed Head of the Canvassing & Development Section of the same office in 1946.

Mr. N. S. Robinson, A.M.I.C.E., Assistant to Civil Engineer (Maintenance), North Eastern Region, who, as recorded in our January 4 issue, has been appointed District Engineer, Barrow, London Midland Region, was educated at King's School, Peterborough, and joined the L.N.E.R. in 1926 in the District Engineer's Office at Peterborough. In 1937 he moved to the District Engineer's Office at Kings Cross and three years later joined the Headquarters Permanent Way Office, L.N.E.R. (Southern Area), Kings Cross, where he was mainly concerned with permanent way works in connection with the Manchester-Sheffield-Wath electrification scheme. In 1941 he was transferred to the District Engineer's Office at Guide Bridge and remained there until 1946, except for a period when he was Resident Engineer on Ministry of War Transport works in North Wales. He took up the position of Technical Assistant to the Chief Engineer of the former L.N.E.R. (Mr. J. C. L. Train) in 1946, and held that post until nationalisation, when he was transferred to Railway Executive headquarters as Maintenance Assistant. Since the end of 1948, Mr. Robinson has been Assistant to Civil Engineer (Maintenance), at York.

Mr. Gordon R. Ball has been appointed to the board of Directors of the International Nickel Company of Canada Limited.

Mr. A. J. W. Graham resigned his position of Technical Controller with Messrs. Sandberg, Consulting & Inspecting Engineers, as from January 31, but is continuing his other activities.

The Road Haulage Executive has announced the following appointments:—

Mr. W. L. Russell, Divisional Engineer for the Eastern Division, to the corresponding post for the Midland Division. He will succeed Mr. R. Mackenzie, who is leaving the Executive's service to take up the appointment of General Manager & Engineer of the Halifax Corporation Transport Department.

Mr H. Q. Hudson, District Engineer for the Bristol District, as Divisional Engineer for the Eastern Division.

Mr. S. A. S. Smith, Assistant Works Manager (Locomotives, Outdoor Machinery & Electrical), Swindon, Western Region, who, as recorded in our January 18 issue, has been appointed Locomotive Works Manager, Horwich, London Midland Region, began his railway career in 1926 in the Locomotive Works at Swindon, where he had five years apprenticeship in fitting, turning and erecting. Subsequently he was transferred to the drawing office and was engaged on general engineering machinery and plant, including electrification schemes for pumping stations. In 1941 Mr. Smith became Assistant Divisional Locomotive Carriage & Wagon Outstation Superintendent, Bristol, and in 1944-45 was loaned to the headquarters of the Locomotive Running Department, Swindon; afterwards he became Assistant Divisional Locomotive Carriage & Wagon and Outstation Superintendent, London. Mr. Smith returned to Swindon in 1948 as Assistant Works Manager (Locomotives, Outdoor Machinery & Electrical).

The Metropolitan-Vickers Electrical Export Co. Ltd. has announced that Mr. F. C. Gray has been appointed Manager for Spain.

Mr. V. W. Pilkington has been appointed Chief Engineer to the Leyland Motors Limited (Ministry of Supply) Factory and will be responsible for the design and development of units associated with that factory.

Mr. C. E. Ayres, O.B.E., former Operating Superintendent, Country Buses & Coaches, London Transport Executive, whose death we recorded briefly in our February 1 issue, entered the service of the East Surrey Traction Company in 1919, and was appointed Traffic Superintendent in 1921. On the incorporation of the company in London General Country Services Limited, Mr. Ayres was made Traffic Manager, and on the establishment of the L.P.T.B. the following year, was appointed Operating Superintendent (Country Buses & Coaches), a position which he held until his retirement in July, last year. In 1941 Mr. Ayres was seconded to the Ministry of War Transport to reorganise colliery and workers' services in South Wales and

was largely responsible for the scheme for subsidising colliery services by the Ministry of Fuel & Power; he was appointed Deputy Regional Transport Commissioner, Wales Region, in 1942. For these services he received the O.B.E. in 1946.

Mr. K. E. Merefield has been appointed a special Director of the Superheater Co. Ltd.

Mr. J. V. Daniel has been elected to the board of Crompton Parkinson Limited. He has been an Executive Director of Crompton Parkinson Limited since 1946 and in 1949 was appointed Assistant Managing Director (Works), in that capacity assisting the Joint Managing Directors of the company on works matters.

Mr. G. P. Belsham has been appointed a Joint Managing Director of Brookhirst Switchgear Limited, of which company he has been a Director since 1948. Mr. Belsham is also a Director of Cantie Switches Limited. Mr. K. N. Swash, Chief Engineer of the company since 1948, has been appointed a Director of Brookhirst Switchgear Limited.

Mr. A. Tims, B.Sc., A.M.I.C.E., District Engineer, Barrow, London Midland Region, who has been appointed District Engineer, Blackburn, was educated at Barrow Grammar School and began his railway career as a pupil in the Engineering Department on the Furness Railway in 1919. In 1923 he became a draughtsman in the District Engineer's Office at Workington, L.M.S.R., and after holding a similar post at Barrow, was made chief draughtsman in the same office. In August, 1937, Mr. Tims was appointed Assistant District Engineer, Barrow, and eight years later became Assistant District Engineer, Derby North. He was appointed District Engineer, Barrow, in September, 1947.

We regret to record the death of Colonel E. T. Brook, C.B.E., former Superintendent of Rolling Stock (Railways), London Underground Electric Railways and L.P.T.B., 1921-41. After completing his education at Shrewsbury, he was apprenticed to the White Star Line and to the Liverpool Electric Supply Company and, at the age of 21, went to Rhodesia, where he served for three years in the mounted police. He joined the London Underground Electric Railways in 1904 and was employed on the electrification of the District Railway and the construction of certain tube lines. In 1921 he took charge of lifts and escalators and in the following year was appointed Superintendent of Rolling Stock (Railways). When the Soviet Government wished to construct a tube railway in Moscow, Colonel Brook was one of four London Transport officials who went to Moscow in 1932 to study the problem and make recommendations for the layout and construction of an underground railway system. The Soviet Government signified its appreciation by conferring on each of the four officials the Decoration of Merit. In 1938 Colonel Brook was appointed chairman of the L.P.T.B. A.R.P. Committee, in addition to his position as Superintendent of Rolling Stock. In May, 1940, he formed and was given command of the London Transport Home Guard, with seven battalions and a roll of 18,000. As the claims of Home Guard and A.R.P. work grew, he relinquished his position of Superintendent of Rolling Stock in August, 1941. For his work in connection with the Home Guard, he received the C.B.E. in 1944. Colonel Brook retired in March, 1945.

Institution of Railway Signal Engineers

Speed restriction signalling on the London Underground lines

At a meeting of the Institution of Railway Signal Engineers in London on January 9, with Mr. T. S. Lascelles, Vice-President, in the chair, in the absence of the President, Mr. S. Williams, a paper was read by Mr. W. Owen, Member of Council, entitled "Special Signalling for Temporary Speed Restrictions on London Transport Tube Lines." This described the difficulties arising from the necessity of renewing track formation and equipment in tube tunnels, where much of it had been laid originally many years ago, and the effect on the traffic running of speed restrictions which had to be imposed as work progressed.

Graphical Analysis

A graphical analysis of these effects was given, and a detailed explanation of the work of the special portable signalling apparatus developed by the Signal Engineer of the London Transport Executive to enable the train service to be carried on without withdrawing any facilities, which would be severely felt in rush hours. A complete set of this apparatus was demonstrated with the assistance of Mr. A. E. Papworth and Mr. V. J. Searson and the paper was illustrated by lantern slides.

Mr. W. G. Wheable enquired during the discussion whether the speed measurements mentioned as having been taken at certain locations had been made on some section selected for the purpose or at random.

Mr. B. Wagenrieder asked whether an alteration in the length of a train would exert any effect on the working of the timing track section, as, for example, when trains were added to for the rush periods. In the case of work being done in, or close to, a station platform would they rely on the fact that trains had to stop there in the ordinary course, or would this special equipment be installed just the same?

Mr. E. G. Brentnall referred to the compromise made in the matter of placing the initial timing section, and the signal working with it, to prevent both the possibility of irregular acceleration and chance of overrunning the signal. In the case of main-line speed restrictions the permanent way engineers were very unwilling to risk any additional stress being put on the track under repair and did not like a train to run on to it with its brakes applied, as that caused a greater impact effect and stress than if the brakes were off.

Time Element Relay

The design of the time element relay with rubber roller clutch engagement instead of gearing was interesting and presumably had been arrived at after careful consideration of alternative methods. Was it the practice to make any use of the existing signals, disconnected from their regular controls and wired up to the temporary working, while making use of some of the existing relay contacts, and, if so, where was the disconnection made in order to bring in the temporary apparatus?

Mr. J. H. Fraser thought that the equipment was a well-thought-out example of detailed design work adapted to the rapid installing of signals and their controls. The choice of 100 ft. as the timing section was of interest in that apparently the rails were 60 ft. long.

Mr. H. J. N. Riddle referred to the speed limit laid down and the absence of speedometers on certain trains and said that the disadvantage of that appeared to be indicated by the fact that tests had been taken and on occasion the speed had been found to be on the high side. If it was difficult for drivers to keep to the figure without having a speedometer, was there no risk of speed being increased on the long sections calling for three temporary signals?

After Mr. Owen had replied to the various points raised the Chairman moved a vote of thanks to him for his paper and for the trouble taken by Mr. Owen and his staff in demonstrating the equipment described in it.

Southern Region Operating and Motive Power Dinner

The successful experiment last year of holding a combined dinner by the Operating and Motive Power Departments of the Southern Region, British Railways, was repeated in London on January 8. Mr. S. W. Smart, Superintendent of Operation, was in the chair, and was supported by Mr. T. E. Chrimes, Motive Power Superintendent, and an attendance of 153.

The principal guests were Mr. John Elliot, Chairman of the Railway Executive, Mr. C. P. Hopkins, Chief Regional Officer, Mr. F. E. Campion, Civil Engineer, Mr. L. J. Boucher, Signals & Telecommunications Engineer, and Colonel P. M. Brooke-Hitching.

Mr. Smart welcomed Mr. John Elliot and referred to the value of the service he had rendered, first to the Southern Railway, and later to British Railways, by his businesslike attitude that the primary object of a railway was to carry passengers and freight to the satisfaction of the customers. Mr. Smart assured Mr. Elliot that in the difficult times ahead he could count on the wholehearted support of the Southern Region.

Mr. Chrimes referred to the difficulties overcome by the Operating Department, both in its daily task of moving business travellers and its summer traffic load, and referred to the skill involved in planning and carrying out this work. He stressed the importance of all grades of staff in all departments playing their part to enable the Operating Department to carry out these and other onerous responsibilities in an efficient way.

Replying, Mr. Smart congratulated the Motive Power Department on its successful efforts in achieving a record of safety and punctuality second to none, not only with passenger trains, but with freight trains as well.

Punctuality

Mr. Elliot, replying to the toast of the guests, referred with satisfaction to the fact that a very high standard of punctuality was maintained in the Southern Region, and that freight movement was practically free from restriction, which was an example of what could be done by the united efforts of all.

Mr. C. P. Hopkins, Chief Regional Officer, congratulated the departments on their work during 1951, and assured them of his good wishes for 1952, expressing confidence in the future.

International Refrigerated Traffic

New wagons operated by Interfrigo for the transport of perishables in Western Europe

Last week Interfrigo (Société Ferroviaire Internationale de Transports Frigorifiques) held an exhibition at Victoria Station, London, of new refrigerator wagons for the international transport of perishables.

The company was formed by the railway administrations of Western Europe in 1949, with the object of undertaking all operations to obtain and maintain the most suitable temperature for transporting perishables, from production to final delivery. To provide and develop international transport at controlled temperatures the company was to be concerned principally in the construction, hiring out and operation of the necessary rolling stock and plant.

Since October 30, 1950, the company has been operating with the existing rolling stock of its member-administrations and subsidiaries, but at the same time workshops in France, Belgium, and Switzerland have been building wagons designed by the technical experts of all the member countries and ordered and financed by Interfrigo itself. There is a working agreement with certain Iron Curtain countries, which, however, are not members of Interfrigo.

Transport of Meat

The two wagons exhibited at Victoria Station differ only in that one was built in Switzerland and the other in Belgium; the second was specially fitted with meat bars and hooks for the transport of meat.

There are 350 of these wagons built to the British loading gauge—70 fitted with meat bars and hooks—and all were expected to be in service by the end of last month. The design is by Dr. Fasoli, of the Italian State Railways, to the specifications of the Interfrigo Technical Committee.

The wagons, although specially suitable for the transport of fresh fruit and vegetables to this country from the Continent, can be used equally well for the export of perishable commodities from Great Britain. The meat wagons in particular may be used for the beef traffic from Ireland and horsemeat from England.

Some of the principal dimensions of the new wagons are given in the following table:—

Tare weight	17 tons 10 cwt.
Length over buffers	35 ft. 0½ in.
Length of body	30 ft. 7½ in.
Height of body	12 ft. 3 in.
Width of body	8 ft. 8½ in.
Floor area	183 sq. ft.
Capacity (approx.)	14 tons
Volume	1,095 cu. ft.

The floor has Onazote insulation, 100 mm. thick; the roof and walls are insulated by Isoflex and expanded cork respectively, to a thickness of 140 mm.

Method of Refrigeration

Refrigeration is by water ice carried in two ice bunkers situated at each end of the wagon. Special features are the Granilastic floor, wooden floor gratings, roller-bearing axleboxes, meat hooks and bars for the carriage of carcase meat, and eight Flettner ventilators. The ventilators are actuated by the wind current set up by the motion of the train. Cold air is drawn from the ice bunkers and distributed in the wagon.

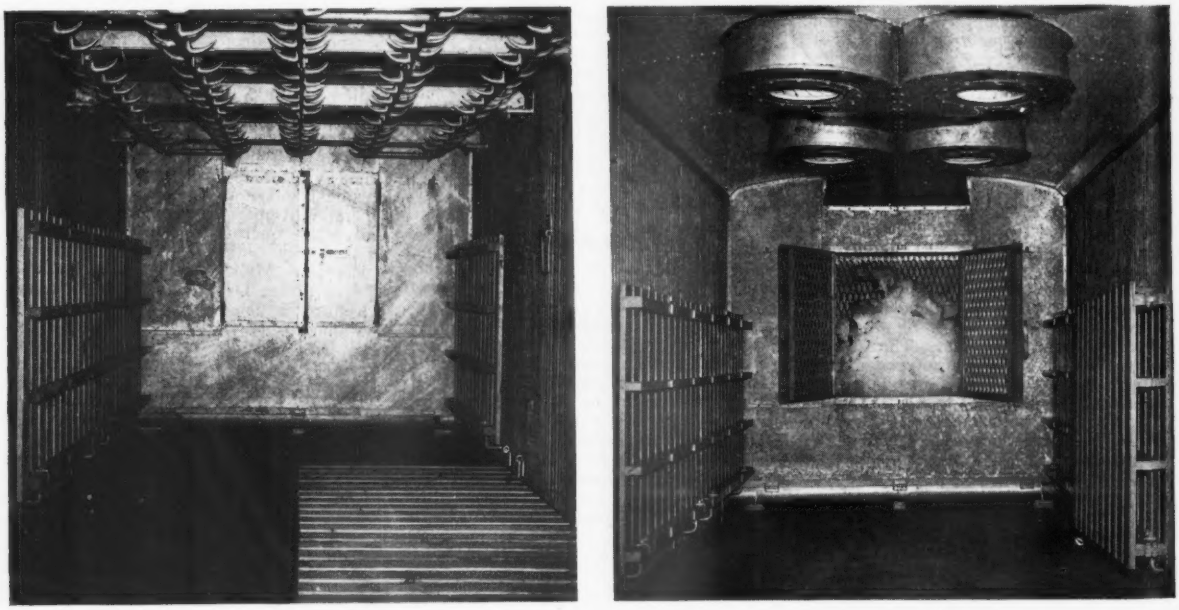
Among those who inspected the wagons were: Messrs. V. M. Barrington-Ward, Member, Railway Executive; G. M. Leach, Assistant to Chief Officer, Continental (representing Mr. R. H. Hacker, Chief Officer, Continental), Railway Executive; A. E. Hammett, Commercial Superintendent, and F. E. Bailey, Assistant to Commercial Superintendent (Overseas & Continental), London Midland Region; A. Mertz, Manager, Belgian Railways & Marine, London, and M. E. F. Gaveau, Secretary, French Railways Limited, London.

Through Railway Transport in Eastern Europe

On November 1 last, two conventions, known respectively as the M.P.S. (passenger and express parcels traffic) and the M.G.S. (freight traffic), came into force, governing through conveyance by rail of traffic passing between or through any of the states signatory to the conventions. These agreements were finally drawn up and concluded at a conference of Government and railway officials from a number of East European countries, which took place in Warsaw in December, 1950. Besides the Soviet Union, the countries represented included Bulgaria, Czechoslovakia, Hungary, Poland, Roumania, and the East German Republic. Preliminary meetings had been held in Warsaw in 1948 and Belgrade in 1949.

Within the territory of countries adhering to them the conventions supersede the long-established Berne Conventions which hitherto applied to all European and a few contiguous countries, with the exception of Great Britain. The conclusion of the Warsaw agreement is not intended, however, to preclude through working of traffic with other countries, including those of Western Europe. Day-to-day supervision of the M.G.S. and M.P.S. is in the hands of the Polish State Railways as managing administration, and the latter also discharges functions similar to those performed by the office of the Central Transport Committee (C.I.T.) at Berne, which works independently of the Swiss Federal Railways.

The new agreement is generally regarded



Interior of new Interfrigo vehicles showing (left) meat bars and hooks for the transport of carcase meat, and (right) wagon for fruit and vegetable traffic, with ice bunker opened at end and ventilators in roof

as being at once less rigid and more precise than the Berne Conventions, which were liable to give rise to lengthy legal argument bearing on the interpretation of the terms used, as well as to prolonged discussions at the periodical revision conferences and loss of time until sufficient Governments had ratified the decisions through their Parliaments to enable them to come into effect.

Regular conferences of the railways adhering to the M.P.S. and M.G.S. are to be convened every two years, but meetings may be held more frequently to decide important matters of principle. Various provisions contained in the Berne Conventions have been included in the two new Conventions; others appear in abbreviated form or are not covered. As most trading concerns in the countries of Eastern Europe have been nationalised, the M.P.S. and M.G.S. doubtless reflect more appropriately than the older conventions the new relationship between the State railways and their users.

The Midland Railway Co. of Western Australia Ltd.

In a statement accompanying the report and accounts for the year ended June 30, 1951, Mr. Robert W. Adeane, Chairman, Midland Railway Co. of Western Australia Ltd., said that the results reflected a continuation of the trends alluded to last year. An increase of over 30 per cent. in ton-mileage demonstrated the increased amount of work done. Goods tonnage of 202,000 comfortably surpassed the previous maximum of 166,000 in 1929. The wheat harvest in 1951 was excellent, and the 100,000 tons which the company accepted for conveyance was a record. The tonnage carried during the year under review showed an increase of 54 per cent on the previous year. Passenger receipts, which had declined by over 70 per cent. in the last five years, showed a decrease of 3·2 per cent.

At £320,000, working expenses showed an increase of £110,000, or nearly 53 per cent. As the result of the application for an increase in rates the company was permitted to raise charges to the same level as those of the Western Australian Government Railways, and classifications also were revised so that the charges on the two systems were now the same. This increase came into force only on May 1 and the company suffered severely from the lag between the incidence of increased costs and the authorisation of increased charges to compensate for them. Thus though the record traffics carried produced an increase of £88,000 or 35 per cent. in gross receipts, increased working expenses resulted in a decline in the net earnings of £22,000, or 53 per cent. Statutory increases during the year produced a rise of some 30 per cent. in the basic wage rate, which in a full year would add some £40,000 to the wages bill. Another increase granted since the end of the year would add a further £11,500 to the wages costs.

To meet the cost of new wagons and other necessary improvements £45,000 4½ per cent. first mortgage debenture stock at 90 per cent. was issued. Receipts during the current year up to the end of October showed an increase of some £89,000 compared with last year. These figures afforded little indication of the company's profit earning prospects, as expenditure continued to increase in every department. The decline in passenger traffic continued, but the tonnage of goods traffic carried now showed a small increase. The increase in charges operated during only two months of the 1950-51 accounting period, but would be reflected to a greater extent during the current year, provided that there was no decline in tonnage carried. Wage increases, which only affected part of the former year's accounting period, would influence net earnings during the whole of the current year.

Railway Reform in Brazil

The executive of the Brazilian Government's Railway Reform Plan is being accelerated within the financial resources at the Government's disposal, independent of the recommendations of the Brazil-United States Commission for Economic Development.

During the month ended December 15, 1951, the Export-Import Department issued licences to import railway material to the value of £12,779,382 (locomotives, £12,035,692; spare parts for locomotives, £584,405; wheels and miscellaneous materials, £159,285). Four permits were granted to import locomotives from the United States, and three from Germany and one from Canada. Licences to import miscellaneous materials were distributed between the United States (£72,260), Great Britain (£57,410), Germany (£28,211), and Italy (£1,404).

In December the following orders were placed with local manufacturers by the National Department of Railways:—

Fabrica Nacional de Vagoes, S.A. (Sao Paulo) : fifty 30-ton closed steel wagons at £3,140 each, for delivery within 150 days.

Companhia Industrial Santa Matilda (Minas Geraes) : thirty 30-ton drop-bottom steel wagons, at £3,240 each, for delivery within 60 days.

Companhia Brasileira de Material Ferroviario (Sao Paulo) : fifty 30-ton closed steel wagons, at £3,140, for delivery within 150 days.

The following contracts were signed in November and December:—

Between the Federal Government and Groupement d'Exportation de Locomotives S.A.R.L. (GELSA) for the supply of spare parts and accessories for locomotives and tenders. Value of contract, U.S. $709,314.

Between the Rio Grande do Sul Railway (Viacao Ferrea de Rio Grande do Sul) and Industrias Reunidas de Ferro e Aco (the national locomotive factory), for ten diesel-mechanical engines.

Between the Central of Brazil Railway and three foreign companies (two American and one Canadian) for the supply of 120 diesel-electric locomotives. Value of contract U.S. $25,000,000.

In addition the National Department of Railways has been authorised to acquire ten electric locomotives and two complete trains, for service on the Eastern Railways of Brazil between Sao Paulo and the southern frontier.

President Vargas has asked Congress for a special credit of £800,000 to complete the connection, begun several years ago, between Blumenau in Santa Catarina and the port of Itajai.

Although large orders will be placed in the United States under the Railway Reform Plan, American manufacturers expect difficulties in meeting the demand for iron and steel and equipment, because of the U.S.A. defence programme and the requirements of their own railways. The Brazilians, on the other hand, must divert a large part of their purchases to Europe if they are to avoid another threatened dollar shortage. Some European countries are seeking to increase commercial relations with Brazil to escape dollar payments.

An agreement signed with Western Germany in December provides for the following exports to Brazil: iron and steel, U.S. $2,000,000; iron and steel manufactures, U.S. $10,300,000; locomotives and accessories, U.S. $1,300,000; railway wagons, U.S. $800,000. Large quantities of hand and machine tools, electrical material, and diesel motors are also included. The Franco-Brazilian agreement signed in August last schedules: railway materials, including locomotives, U.S. $8,000,000; steel, U.S. $2,450,000; iron and steel tubes, U.S. 3,000,000; and machine tools, U.S. $1,200,000. The Anglo-Brazilian agreement, which expired on June 30, 1951, was not renewed as the British authorities considered that greater benefits would result from free commercial exchanges.

Swedish Talgo-Type Train Suggested

A Swedish engineer, Mr. Erik Aspenberg, has proposed a new design for passenger stock for the Swedish railways. Analysing the reasons which have put railway passenger traffic on the defensive against the increasing competition of the motorcar, he blames mainly the traditional design of railway rolling stock which, because of its weight, is uneconomic both in first cost and in operation and maintenance.

A typical Swedish State Railways express train, with an electric locomotive, luggage van, two second class coaches, restaurant car, and ten third class carriages, has a tare weight of 646 *tonnes*, accommodates 900 seated passengers and has an overall length of 370 m. Its first cost is nearly kr. 4,000,000, and it needs 3,500 h.p. for its operation. The dead-weight of over ½-*tonne* a seated passenger is nigh and is also reflected in comparatively high maintenance costs.

To reduce train weight drastically it is necessary to forsake conventional ideas of design and make trains shorter, lower, and lighter, resembling the Talgo train of the Spanish railways. The author has prepared a design of his own which he calls KLL train, from the initials of the Swedish words for shorter, lower and lighter.

A train of this type, consisting of electric locomotive, luggage van, two second class coaches, kitchen car, dining car and ten third class carriages would have 410 seats and a total tare weight of 173 *tonnes*, or less than ½-*tonne* of dead weight a seated passenger. The traction power and first cost per seat would be considerably less. It would have an overall length of only 175 m.

The coaches would be two-axle, with the wheels rotating freely on fixed axles. The floor height of the coaches would be considerably lower (50 cm. above top of rail) than on conventional coaches (126 cm.) so that boarding and alighting would be easier. The overall height of the coaches would be 3 m. (9 ft. 10 in.) above top of rail. Current for electrical equipment of the coaches (lighting, heating, ventilation) would be supplied by the locomotive. Because of the low floor height, the equipment normally accommodated below the floor would be housed in cabinets in the coaches. With the reduced air resistance as a result of the less height, a 900-h.p. locomotive would be able to haul the train at maximum speeds of at least 84 m.p.h.

Parliamentary Notes

Steel Allocations

Mr. R. A. Butler, Chancellor of the Exchequer, in his statement to the House of Commons on January 29 on the financial and economic position, referred to the allocations of steel. He said that many felt that the allocations of steel for the current quarter did scant justice to their performance and efforts in the export field, and they hoped that their efforts would progressively receive more encouragement in the way of steel supplies. A move in that direction, though not as far as they would like, would be made in the allocations for the second quarter which they would try to get out to industry as soon as possible so as to help manufacturers to plan ahead. Thereafter, they hoped for deliveries of the steel from U.S.A., and that, he hoped, would ease the position.

Railwaymen and Corporation Houses

The adverse effects on railwaymen of the proposed sale of 600 houses by the Glasgow Corporation were referred to by Mr. David Jones (Hartlepools—Lab.) on January 29. Many key workers on the railways, he said, were applicants for Corporation houses, and if the decision to sell were authorised, they would be put far back in the list. This might result in many important railway jobs not being filled, as men were unwilling to accept posts involving a move unless they were assured of housing. He asked the Secretary of State for Scotland what action he proposed to take.

Mr. James Stuart, in reply, outlined the conditions on which sale would be allowed, which, he said, took this point into consideration.

Questions in Parliament

Railway Charges

Mr. F. H. Hayman (Falmouth & Camborne—Lab.) on February 4 asked the Minister of Transport whether he would consider the inclusion of Cornwall amongst those areas to which special concessions would be given in railway charges, because of the long distance from the main centres of distribution with special reference to the horticultural and fishing industries.

Mr. J. S. Maclay stated in a written answer: The increase of 10 per cent. in railway freight rates which I authorised to take effect from December 31 last was limited by a maximum addition of 10s. a ton generally. This limitation was designed to help the more distant parts of the country. The future position will, of course, be governed by the Charges Schemes which will be settled by the Transport Tribunal.

Railwaymen's Pensions

Mr. W. T. Procter (Eccles—Lab.) on February 4 asked the Minister of Transport if he was aware of the difficulties confronting railway pensioners as a result of the increase in the cost of living; and if he would make regulations to ensure suitable increases in the pension rates.

Mr. J. S. Maclay in a written reply stated: I am aware of the difficult position of any person dependent on a pension or other form of fixed income in face of a rising cost of living. In addition, however, to the general questions of policy involved, any increase in pensions for railwaymen must depend on the ability of the B.T.C. to meet the cost.

Closing of Branch Lines

Sir Waldron Smithers (Orpington—C.) on February 4 asked the Minister of Transport if he would introduce legislation to provide an appeal to an independent court of law on decisions to close branch lines made by the Railway Executive.

Mr. J. S. Maclay stated in a written answer: The Central and Area Transport Users' Consultative Committees provide facilities for discussion of matters affecting the services and facilities provided by the B.T.C., and I have the Commission's assurance that the Railway Executive will inform the appropriate area consultative committee of any proposed withdrawal of railway services. This procedure should provide adequate opportunity for full examination of such proposals.

Waveney Valley Line

Mr. P. A. D. Baker (South Norfolk—C.) on January 29 asked the Minister of Agriculture whether he would consult with the B.T.C. with a view to preventing closing of the Waveney Valley line, because of its agricultural importance.

Sir Thomas Dugdale in a written answer stated: I do not propose to intervene as adequate facilities exist for representations by any local interest likely to be affected, under Section 6 of the Transport Act.

Highland Transport Costs

Mr. J. Grimond (Orkney & Shetland—L.) on January 29 asked the Secretary of State for Scotland whether he was now in a position to announce any reduction of freight charges in the Highlands and Islands.

Mr. James Stuart: I understand that the B.T.C. is now preparing for submission to the Transport Tribunal a draft scheme of freight charges and has undertaken to keep in mind the recommendations of the Committee on Highland Transport Costs which was appointed by the Scottish Council, the Scottish Board for Industry, and the Advisory Panel on the Highlands & Islands.

New Railways in Africa

Mr. James Johnson (Rugby—Lab.) on January 30 asked the Secretary of State for the Colonies, what surveys had been made for railway development to link Broken Hill, in Northern Rhodesia, to the East African system, and to the ports of Mtwara and Dar-es-Salaam in Tanganyika; and whether the results were favourable for each development.

Mr. Oliver Lyttelton: Separate engineering and economic surveys are being made of the possible railway links between the two systems and reports are expected in about six months' time. Meanwhile, results cannot be assessed, or decisions taken.

ROAD CASUALTIES IN NOVEMBER, 1951.—Casualties on the roads of Britain in November, 1951, totalled 19,052, which was 1,034 more than in the corresponding month of the previous year. Killed numbered 563, an increase of 53, and seriously injured 4,848, an increase of 468.

GOODS TONNAGE RECOVERY IN NEW ZEALAND.—After the settlement of the waterfront dispute in July, 1951, and the resumption of normal work throughout New Zealand, goods traffic soon recovered. From August 19 to December 8 (16 weeks) the tonnage of goods and livestock carried averaged 211,093 tons a week, an increase of 4·2 per cent. over that carried during the corresponding period in 1950, itself a record.

Staff & Labour Matters

Pay Increases for Senior Civil Servants

The Treasury has announced pay increases for civil servants earning between £1,500 and £2,000 a year. The increase is at the rate of £100 per annum; it will cost £200,000 and follows on the substantial increases recently accorded to civil servants earning less than £1,500 a year. No increases can be granted to senior grades with annual salaries above £2,000.

Dock Workers' Pay Claim

After discussions with Sir Robert Gould, Chief Industrial Commissioner of the Ministry of Labour, representatives of the port employers and unions agreed on January 30 to appointment of a tribunal by the Minister of Labour for settlement of the claim by the dock workers for higher pay and longer holidays. This claim is for a substantial increase in pay, a second week's annual paid holiday, and higher guaranteed wages for about 100,000 dock workers.

Notification of Vacancies Order

A new Order, the Notification of Vacancies Order, designed to regulate distribution of labour throughout the country, is to come into operation on February 25. It is to ensure that essential industries are adequately manned and that workers wishing to change their work are directed to the industries regarded as most important in the national interest.

Employers must engage workers through a Ministry of Labour employment exchange or through an agency registered by the Ministry for that purpose. Exceptions are the coal-mining, agriculture, docks, sea-fishing, and merchant shipping industries.

All men between 18 and 65, and women between 18 and 60, except those to be employed in a managerial, professional, administrative, or executive capacity, come within the scope of the order.

There is no compulsion for workers to accept jobs offered by the employment exchanges. Employers advertising posts must make it clear that applicants can only be recruited through exchanges.

The order resembles the former Control of Engagement Order. It has been approved by the trade union and employers represented on the National Joint Advisory Council.

C.P.R. EARNINGS.—Net earnings of the Canadian Pacific Railway for 1951 at $26,813,000 were $11,207,000 smaller than for 1950. This was in spite of an increase of $50,336,000 (to $428,912,000) in gross receipts.

LIVERPOOL OVERHEAD RAILWAY.—There were four successive advances in traffics of the Liverpool Overhead Railway during the month of January, as compared with receipts for the equivalent period of 1951. The greatest improvement was in the week ended January 6, when traffics at £2,805, were higher by £489, and on January 27 aggregate receipts had made a £1,186 advance to £11,112.

BROOM & WADE LIMITED.—The final ordinary dividend of Broom & Wade Limited for the year ended September 30, 1951, totals 7¼ per cent. This makes 11¼ per cent. for the year, which is the same as for the previous year, and having regard to the 100 per cent. bonus issue made in September, 1950, is the same ratio of dividend as has been paid for the past 14 years. Group profits were £409,121 against £442,428, less tax of £258,043, against £257,168.

Contracts & Tenders

The Chilean State Railways have placed orders for 30 diesel-electric locomotives in Japan and for 100 passenger coaches in Germany, as part of a broad plan for railway improvement, according to a recent Reuters report.

British Railways, Southern Region, has placed with the General Electric Co. Ltd. a contract covering equipment for 52 substations. The total value of the orders received is approximately £2,000,000. The apparatus being supplied, which forms part of the scheme of frequency conversion, comprises 48 pumpless, steel tank rectifier equipments for 23 substations and 33 kV., 750 MVA., e.h.t. switchgear for 52 substations. Each rectifier installation is rated at 2,500 kW. and will supply power to the track at 660/750 volts d.c.

The General Electric Co. Ltd. has already supplied rectifier equipment totalling 67,500 kW. for the Greater London Area, which, together with the new equipment, will constitute the largest concentration of pumpless rectifiers on any railway system in the world. When the new contract is complete, the total installed capacity of the company's pumpless rectifiers on railways in this area will be 194,000 kW.

Editorial reference to the forthcoming reconstruction of the Southern Region power stations at Durnsford Road and Deptford East for generation at 50 cycles was made in our October 26, 1951, issue.

A recent Reuters report states that the Montreal Locomotive Works has received an order from the Central Railway of Brazil for 48 diesel-electric locomotives; delivery is expected to begin in the last half of this year.

The Docks & Inland Waterways Executive has announced that contracts have been placed for three twin grab hopper dredgers with diesel engines. The vessels are intended for use at the Humber Ports, South Wales Docks and Garston Docks.

The dredgers will be in accordance with drawings and specification prepared by a sub-committee of the Docks Engineers' Committee of the Docks & Inland Waterways Executive and the Railway Executive, under the Chairmanship of Mr. W. Mackenzie, Engineer (General Duties) to the Docks & Inland Waterways Executive. Two of the vessels will be built by Henry Scarr Limited, Hessle, which is controlled by Richard Dunston Limited, Thorne, and one by Cook, Welton & Gemmell Limited, Beverley. The total cost will be over £350,000.

According to the Board of Trade Special Register Information Service, the Ministry of Communications (Railway Division), Government of Pakistan, has issued a call for tenders for steel rails and fittings, representing one quarter of the requirements of the North Western Railway during the year 1952-53, as follows:—

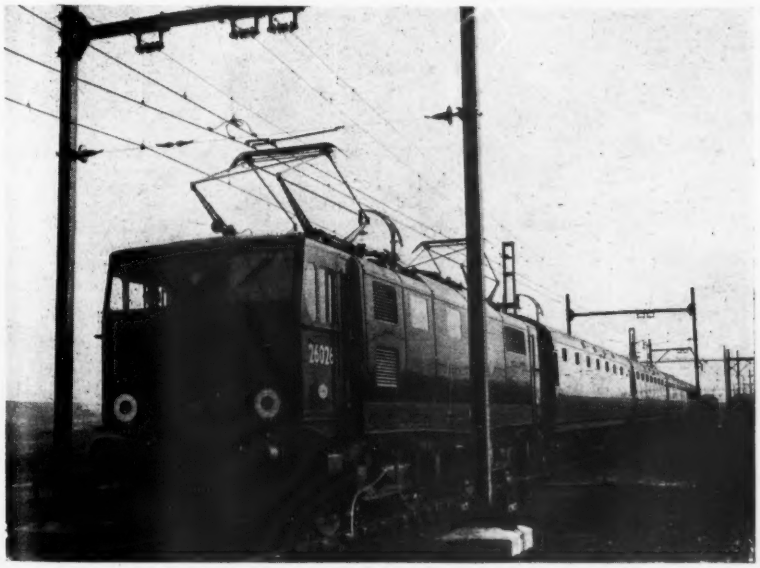
11,456 tons	Medium manganese steel rails 90 lb. "R" flatbottom B.S.S. in 42 ft. lengths.
394 tons	Fishplates for 90 "R" flatbottom B.S.S. rails
81,648, or about 85 tons	Fishbolts with nuts (5 in. × 1 in. dia.)
10,56,000, or about 357 tons	Dogspikes 5⅜ in. × ⅝ in. × ⅝ in.
2,34,720, or about 1,444 tions	Bearing plates (single rail canted) for 90 "R" rails

The rails and rail fittings are required for delivery in Pakistan urgently and in any case not later than August 31. Tenders should reach the Office of the Director General (Railways), Railway Division, Ministry of Communications, Government of Pakistan, Karachi, before 11 a.m. on February 26, in a sealed envelope endorsed "Tender for Rails and Rail Fittings."

A copy of the tender documents and drawings is available for inspection by representatives of United Kingdom manufacturers at the Board of Trade Commercial Relations & Exports Department. Further copies, including tender forms, can be obtained from the Office of the High Commissioner for Pakistan, 34, Lowndes Square, London, S.W.1, on payment of Rs. 50 for each set.

A further report from the Board of Trade Special Register Information Service states that the South African Railways have issued a call for tenders (B.3474) for the supply and delivery of narrow-gauge steel bogie wagons. Tenders should reach the South African Railways before April 10. Tender forms with full particulars may be obtained from the South African High Commissioner, South Africa House, Trafalgar Square, London, S.W.1, on payment of £50 for the first copy and £25 for succeeding copies.

Wath—Dunford Bridge Electrification



Trial run on January 31 of special train between Wath and Dunford Bridge, hauled by Bo-Bo locomotive No. 26026 (see article in this issue)

Notes and News

Draughtsman Required.—The Gloucester Railway Carriage & Wagon Co. Ltd., Gloucester, has a vacancy for draughtsmen. See Official Notices on page 167.

Vacancy for Designer Draughtsman.—A designer draughtsman is required for railway rolling stock manufacturers in South Wales. See Official Notices on page 167.

Manchester Ship Canal.—In an editorial article entitled "Manchester in Transport" in our January 18 issue the date of the opening of the Manchester Ship Canal appeared in error as 1849. It should have been 1894; the canal was opened for traffic in January of that year and officially by Queen Victoria in May.

Institution of Locomotive Engineers.—At a general meeting of the Institution of Locomotive Engineers, to be held on Wednesday, February 20, at 5.30 p.m., at the Institution of Mechanical Engineers, Storey's Gate, S.W.1, Mr. G. C. Marsh will read a paper on "Recent Developments in Vacuum Brake Equipment."

Junior Assistant Traffic Superintendent Required.—Applications are invited for the post of junior assistant traffic superintendent, between 25 and 35 years of age, required by the Government of the Federation of Malaya for the railway department, for one tour of three years with prospect of pensionable employment. See Official Notices on page 167.

Accident Prevention Conference. — The London Industrial Co-ordinating Committee of the Royal Society for the Prevention of Accidents has arranged an accident prevention conference at Caxton Hall on Monday, February 25, from 10.15 a.m. to 4.30 p.m. The draft programme provides for a morning session at 10.15 a.m., when the Chairman will be Major-General B. K. Young, Director-General of the Royal Society for the Prevention of Accidents. Papers will be delivered on "Management and Accident Prevention," by Sir Ewart Smith, Technical Director of Imperial Chemical Industries Limited; and "Accident Prevention in Relation to Common Law Claims," by Mr. J. C. Corrin, Assistant General Manager of the Midland Employers' Mutual Assurance Limited. At the afternoon session the Chairman will be

Lord Llewellin, President of the Royal Society for the Prevention of Accidents. Papers will be presented on "Some Medical Aspects of Accident Prevention," by Dr. K. Biden-Steele, H.M. Medical Inspector of Factories; and "The Trade Unionist and Accident Prevention," by Mr. J. O'Dowd, Divisional Organiser, the Iron & Steel Confederation.

S.A. Trains de Roues du Centre, London Agents.—C. M. Hill & Co. (Engineers) Ltd. have been appointed London Agents for the Société Anonyme Trains de Roues du Centre, Belgium, manufacturers of light railway material.

Automatic Telephone & Electric Co. Ltd.—The directors of the Automatic Telephone & Electric Co. Ltd. propose to issue in the near future to ordinary and deferred stockholders 544,000 new ordinary shares in the form of a rights issue of two new ordinary shares at 45s. a share for each £5 of ordinary or deferred stock held on January 18. C.I.C. permission has been received.

Siemens and General Electric Dramatic Society.—On January 31 and February 1 and 2, the Siemens and General Electric Railway Signal Co. Ltd. Diamond Players presented "Night was Our Friend," by Michael Pertwee, at the Hirst Hall, G.E.C. Estate, Wembley. The production, under Mr. E. Graham Henderson, was of a high standard and the cast of seven gave a sensitive and capable performance.

Weymouth-Portland-Easton Line Closing.—As from March 3, the passenger train service between Weymouth (Melcombe Regis), Portland, and Easton in the Southern Region will be withdrawn, and the stations on this line closed to passengers. The Southern National Omnibus Co. Ltd. provides regular bus services in this area and these will be augmented as necessary. Parcels and goods traffic will continue to be dealt with as at present.

Dismissals from Derby Carriage & Wagon Works.—About 130 men at the Derby Carriage & Wagon Works, London Midland Region, have been given a week's notice on grounds of redundancy because of the steel shortage and drastic cuts in the building programme. Construction of new passenger coaches has been stopped, and the building of all-steel wagons, which has already been reduced from 50 to 25 a week, is to be further cut by 10 per cent. Overtime in the works was stopped at the end of last year, and the men have been working only a 44-hr. week. Dismissals have been in order of seniority. More emphasis is to be put on repair work, but further dismissals are expected in the carriage and wagon works.

Institute of Transport Visit to Netherlands.—The detailed arrangements for the visit of members of the Institute of Transport and their wives to the Netherlands from May 19 to 29 have been announced. The itinerary has been planned to provide ample opportunity of observing transport developments and methods in the Netherlands; there will also be visits to places of industrial, historic, and scenic interest. Hotel accommodation will be reserved in Amsterdam and all visits will be made from that centre. The provisional programme includes visits by rail to the oilfields at Schoenebeek, the mines at Limburg and the Port of Rotterdam, including the Pernis Oil Refinery; motorcoach tours of the Polders and the Zuyder Zee Works; and a visit to the airport at Schiphol. On May 27 members will spend a day with the Netherlands Railways, and there will be an inspection of the road goods transport organisation; in the evening there will be a dinner by invitation of the President of the Netherlands Railways.

North Eastern Region Football Specials.—The North Eastern Region of British Railways ran nine trains from Newcastle to London for the fourth-round F.A. cup match between Tottenham Hotspur and Newcastle United on February 2. Four trains ran overnight to Kings Cross and three to Marylebone. Two trains with restaurant car facilities ran direct to Finsbury Park on the morning of the match. At a fare of 38s. 9d., 4,663 travelled to the match, paying £9,000. At the turnstile queues at the ground police were taking people out of the queue and giving them preference if they had a return ticket to Newcastle.

French Railways Films.—Recent 16-mm. sound films produced by the French National Railways cinematographic unit describe aspects of the Paris-Lyons electrification and of modern French marshalling yard practice. "De Fils en Aiguilles" deals generally with electrification from Paris to Lyons, and emphasises the advantages of electric traction and the means adopted of taking the best advantage of the scheme, including concentration of goods traffic *via* Dijon and grouping of fast passenger trains into "batteries" at certain times of day. "Allo Paris! Ici Lyon!" describes the transformation of the telecommunications system between Paris and Lyons, with manufacture and laying of the underground cables now used. "Au Doigt et à l'Oeil" illustrates the replacement of five manual signalboxes at Montereau, where the Paris-Dijon lines *via* Fontainebleau and *via* Hericy converge, by one single automatic relay box. The commentary in these three films is in French. A fourth, "Railroads," with commentary in English, describes modern French marshalling yards, with particular reference to the *combinateur* which presets the route of wagons by means of steel balls falling by gravity through slots in the machine and operating the points by contact with catches.

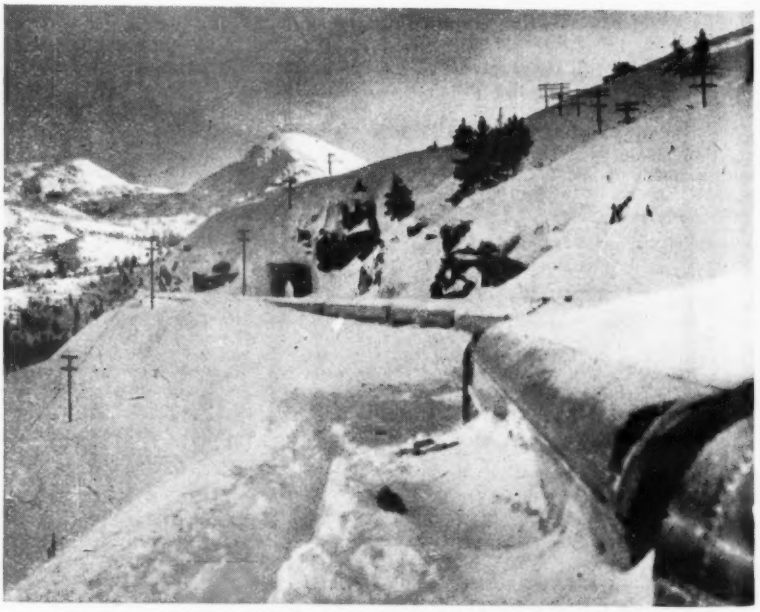
Swedish Travel Bureau.—The telephone number of the Swedish Travel Bureau, 21-22, Coventry Street, London, W.1, is now Whitehall 8161.

Passports not required for Outings to Northern Ireland.—The London Midland Region of British Railways announces that passengers forming organised parties for day outings to Belfast and Northern Ireland need no longer obtain travel permits and passports. This relaxation applies only to travellers of British or Irish nationality. They must, however, carry and produce to the Immigration Officer at the port their civilian National Registration Card.

Sabotage Attempt on Riviera Line.—A German 75 mm. shell weighing 6 lb. was found wedged between the rails and a large stone on the main Paris-Vintimille line near Cannes a few minutes before the Riviera-Strasbourg express was due to pass on February 4. Police said that the shell would have exploded if it had been hit. This is the second time this year that sabotage has been attempted on the line. Earlier this year trees were placed across the line near Cagnes-sur-Mer.

Euston Improvement Scheme.—Another step in the improvement scheme at Euston was taken by the London Midland Region of British Railways on January 27 when the main girders of the Ampthill Road Bridge which has linked Hampstead

Snowbound American Express



The "City of San Francisco" of the Southern Pacific Railroad snowbound in the Donner Pass, California. (*See paragraph in our January 25 issue*)

OFFICIAL NOTICES

DESIGNER/DRAUGHTSMAN required for Railway Rolling Stock Manufacturers in South Wales. Good prospects for man with extensive experience in this class of work. Please give fullest details of age, experience and salary required, etc.—Box 385, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

YOUNG ENGINEER wanted with commercial experience or leanings, or alternatively, young commercial man with technical leanings, for work overseas after training period. Applicant should be ambitious young man anxious to get on, and a good mixer. Work involves sale of engineering products to plantations, mines, contractors, etc., and offers excellent career to right man. Send typed application, with photograph, which will be returned, to Box 9325, FROST-SMITH ADVG., 64, Finsbury Pavement, London, E.C.2.

JUST PUBLISHED.—Twenty-Five Years of the North Eastern Railway, 1898-1922. By R. Bell, C.B.E., Assistant General Manager, N.E.R. and L.N.E.R. Companies, 1922-1943. Full cloth. Cr. 8vo. 87 pages. 10s. 6d.—*The Railway Gazette*, 33, Tothill Street, London, S.W.1.

INTERNATIONAL RAILWAY ASSOCIATIONS. Notes on the work of the various associations concerned with International traffic, principally on the European Continent. 2s. By post 2s. 2d. *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

CROWN AGENTS FOR THE COLONIES

SENIOR ASSISTANT TRAFFIC SUPERINTENDENT required by the Government of the Federation of Malaya for the Railway Department for one tour of three years with prospect of pensionable employment. Salary (including expatriation pay) payable in local currency equivalent at present Government rate of exchange to £742 rising to £1,652 a year. Cost of living allowance equivalent to between £336 and £707 a year according to salary and dependants. Commencing salary according to age and experience. Free passages. Liberal leave on full salary. Candidates between 25 and 35 years of age must be Associate Members of the Institute of Transport or hold equivalent professional or academic qualifications. They should have served as special Apprentices with British Railways and have had considerable subsequent experience in both Traffic Operating and Commercial work, with a sound knowledge of modern railway rating practice. Apply at once by letter, stating age, full names in block letters, and full particulars of qualifications and experience, and mentioning this paper to the CROWN AGENTS FOR THE COLONIES, 4, Millbank, London, S.W.1, quoting on letter M.27696.E. Applicants now serving with British Railways would be eligible for secondment and should apply through their local officers. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration.

DRAUGHTSMAN required, preferably with Steel Car or Diesel Rail Car experience. 5-day week. Pension Scheme in operation. Apply—GLOUCESTER RAILWAY CARRIAGE & WAGON COMPANY, Gloucester.

THE PERUVIAN CORPORATION LIMITED—CIVIL ENGINEERING DRAUGHTSMAN for Southern Railway of Peru, age 25 to 30. Knowledge of instrument work, design of reinforced concrete and steel constructions and some practical experience. Duties not confined to drawing office. Scope for energetic worker. Apply to the Secretary, 144, Leadenhall Street, London, E.C.3.

SENIOR & Junior design engineers and draughtsmen required in London for work on the electrical and mechanical design of traction motors, generators, and control equipment for diesel electric locomotives. Men with first class experience in traction work are required for the senior posts. Good salaries will be paid, and there is a generous staff assurance scheme. Please apply with full details of training, experience, age, etc., to Box 369, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

BOUND VOLUMES.—We can arrange for readers' copies to be bound in full cloth at a charge of 25s. per volume, post free. Send your copies to the SUBSCRIPTION DEPARTMENT, Tothill Press Limited, 33, Tothill Street, London, S.W.1.

Road and Eversholt Street for over 115 years were lifted out by a 50-ton breakdown crane. Over 430 tons of steel bridge girders have to be removed so that the platforms of Euston Station can be lengthened. Full details of the scheme, which is to cost in the neighbourhood of £300,000 and will take approximately two years to complete, were given in our issue of March 16, 1951.

British Railways Coal and Steel Carryings.—British Railways cleared 400,200 tons of coal from deep-mined pits and opencast sites last weekend, making the total for the week 3,106,200 tons. During the week ended January 26, 197,685 tons of iron and steel were conveyed from the principal steelworks.

London Transport Dramatic Club.—On Friday and Saturday of last week, February 1 and 2, the London Transport Dramatic Club presented at the Cripplegate Theatre "Bonaventure," a three-act play by Charlotte Hastings, before large and appreciative audiences. The play was extremely well acted by every member of the cast and it would be difficult to single out one player as better than another, but we should like to mention the excellent portrayal of the part of the simple Willy Pentridge given by Arthur Thompson. The production of the play was in the capable hands of Gladys Burchell.

Machine Tools Diverted to Rearmament.—The diversion of machine tools from civilian users to arms factories forecast by the Ministry of Supply is reported to have been more severe than expected, and manufacturers of civilian goods have received a substantially larger cut than that of 35 per cent. originally announced. Exports have been scaled down to meet urgent home needs for an accelerating arms programme. Concentration mainly is on jet engine construction, for which thousands of machine tools are required. Most of the imported tools needed for jet engine manufacture are likely to be received by the end of 1952. If the machine tool industry in the United Kingdom, which has steadily expanded, is to give equally prompt deliveries, both the supply of materials and the labour force will have to be considerably increased. The principal producers have orders for defence work which will occupy existing resources until the end of 1953, but deliveries are expected to keep pace with the expansion of the aircraft industry, for which factories have still to be built. In the U.S.A., further substantial expansion of the machine tool industry is planned by the 250 manufacturers concerned. Already, by working 24 hr. a day, the industry has increased output 150 per cent. since the outbreak of fighting in Korea, though there is still serious delay in fulfilling the various orders, largely caused by the technical complexity of tool manufacture.

Damage to Korean Railways.—United Nations aircraft are reported to have cut the Korean railways at 130 places in one day recently. Since the operations began last August, according to figures now released railway communication has been cut at more than 13,000 points, 200 locomotives have been destroyed and 212 damaged, 7,600 coaches destroyed or damaged, and 906 bridges and 158 tunnels destroyed or damaged.

Western Region Boxing Contests.—Railwaymen from all parts of the Western Region of British Railways will meet at the Community Centre, Southall, on February 13, to contest the Western Region boxing championships. Entries have been received for more than 40 contests at all the recognised weights. Winners will represent the Western Region in the national quarter-finals of the Inter-Regional Amateur Boxing Tournament to be held at Cardiff on March 13 and Liverpool on March 26.

British Railways Boxing Championships.—Ninety-nine railwaymen from all parts of the London Midland Region have entered for the L.M.R. boxing championships to be held at Crewe on February 23 and Horwich on February 29. Winners of the contest in ten recognised weights will go forward to the quarter-finals of the inter-Regional tournament and if successful will take part in the British Railways championships to be held in London at the Albert Hall on April 18.

Glasgow Air Terminal.—A scheme to use part of St. Enoch Hotel as a new central terminal for air passengers in Glasgow was discussed on February 4 by representatives of the Scottish Advisory Council for Civil Aviation and of the Hotels Executive at a meeting in Glasgow. The detailed plans, which are being submitted to B.E.A., B.O.A.C., and the Hotels Executive for final approval, include the provision of overnight accommodation as well as restaurant and buffet facilities for passengers and their friends. The proposed scheme, outlined by Mr. E. J. Vacher, Scottish representative of the Hotels Executive, is regarded as very suitable. If approved, a portion of the 200 rooms in the hotel would be set apart for the purposes of the air terminal.

Matterhorn Cable Railway.—The first section is reported to have been completed by Italian engineers of a cable railway intended eventually to reach the summit of the Matterhorn. The new Breuil-Cervinia line starts from the Italian resort of Breuil-Cervinia, at the southern base of the mountain and extends to the Furggen Ridge, at an altitude of 11,500 ft., which forms part of the Italian-Swiss frontier near Zermatt. The scheme has been opposed by the Swiss authorities; the present upper terminal, therefore, is built on the Italian side of the frontier, some 3,300 ft. from the Matterhorn summit.

Western Region Train Service Alterations.—Train alterations in connection with engineering work in the Western Region of British Railways will necessitate the suspension of through coaches between Paddington and Stratford-upon-Avon on the 9.10 a.m. train from Paddington and the 5.47 p.m. from Stratford-upon-Avon each weekday from February 4 to March 29. Stratford-upon-Avon passengers change at Leamington Spa General. A change at Shrewsbury for passengers to and from Aberystwyth travelling by the 11.10 a.m. train from Paddington and the 9.55 a.m. from Aberystwyth also is necessary. Passengers for Cardiff on the 9.30 a.m. from Birkenhead Woodside and for Birkenhead on the 12.45 p.m. from Cardiff likewise change at Shrewsbury.

Associated Electrical Industries Limited.—The proposed increase in the authorised capital of Associated Electrical Industries Limited from £10 million to £18 million by the creation of 5,000,000 additional ordinary shares of £1 each and 3,000,000 unclassified shares of £1 each was approved at an extraordinary meeting in London on January 31. After the authorisation of this increase 2,217,649 of the unissued ordinary shares will be offered at 60s. to

holders of the existing ordinary stock registered on January 21 in the proportion of one new share for every £3 of ordinary stock then held. The proposal to increase the capital was reported in our issue of January 18.

Butler Machine Tool Co. Ltd.—Trading profits of the Butler Machine Tool Co. Ltd. for the year ended September 30 last showed a reduction of £4,929 at £58,354, owing primarily to temporary delay in finishing machines in an advanced stage of manufacture in the works. After tax of £38,049, against £37,530, the available net profit was £20,305, against £25,753, of which the preference dividend absorbs £3,985 and the ordinary dividend £13,125. The value of finished machines delivered in October and November was more than double the deliveries in the corresponding months of 1950.

Forthcoming Meetings

February 12 (*Tue.*). — Permanent Way Institution, Sheffield Section, at the Royal Victoria Hotel, Sheffield, at 6.45 p.m. "Can we Mechanise Maintenance," by Mr. W. H. Best.

February 11 (*Mon.*).—Institute of Transport, at the Jarvis Hall, 66, Portland Place, W.1, at 5.45 p.m. Brancker Memorial Lecture: "The Flying Boat and its Place in Aviation," by Air-Chief Marshal Sir Frederick Bowhill.

February 13 (*Wed.*).—Railway Students' Association, London School of Economics & Political Science, Houghton Street, W.C.2, at 6 p.m. "The Changing Pattern of Railway Transport," by Mr. T. H. Hollingsworth, Commercial Superintendent, Scottish Region.

February 14 (*Thu.*).—Engineers' Guild, Metropolitan Branch, at Caxton Hall, Westminster, at 6 p.m. Debate: "That this meeting considers that nationalisation of industry does not adversely affect the status of the professional engineer."

February 14 (*Thu.*).—Irish Railway Record Society. "New Notes on the Dublin & Kingstown Railway," by Mr. Kevin Murray.

February 14 (*Thu.*).—British Railways, Western Region, London Lecture & Debating Society, in the Clerks' Dining Club, Bishops Bridge Road, W.2, at 5.45 p.m. "The Coal Industry and the Western Region," by Mr. E. Havers, Assistant to Commercial Superintendent (Mineral).

February 14 (*Thu.*).—Institute of Traffic Administration, Hull Centre, at the Imperial Hotel, Hull, at 7.30 p.m. "Railway Operation," by Mr. W. G. Thorpe.

February 15 (*Fri.*).—Institute of Transport, Tees-side Section, at the Cleveland Scientific & Technical Institution, Middlesbrough, at 7 p.m. "Railway and Road Transport at High Altitude in Switzerland," by Mr. H. O. Ernst, London Manager, Swiss Federal Railways.

February 19 (*Tue.*).—South Wales & Monmouthshire Railways & Docks Lecture & Debating Society, at the Angel Hotel, Westgate Street, Cardiff, at 6.30 p.m. "Design and Operation of the Iron & Steel Works at Port Talbot," by Mr. W. F. Cartwright, Director & General Manager, Steel Company of Wales Limited.

Railway Stock Market

There have been conflicting factors influencing stock markets, and the volume of business has increased with both buyers and sellers more in evidence. British Funds eased on the generous terms offered by the Southern Rhodesian issue (the first colonial issue since the General Election and the increase in the Bank rate) which tended to make for lower prices for existing stocks. On the other hand, it was argued that the fact that the Southern Rhodesian issue has been made now instead of after the Budget may indicate that the authorities believe a period of relative stability has been reached in the gilt-edged market and that a further increase in the Bank rate is not contemplated.

Engineering and kindred shares were wanted, buyers again coming in on the ground that, despite E.P.T., there should be every prospect of dividends being maintained because of direct and indirect benefits from rearmament work. There will be a difficult period during the switch from normal working to rearmament activities, which may affect profits of some companies; but in most cases there would have to be a very heavy fall in profits to endanger dividends. The activity and strength of German bonds and, to a lesser extent, Japanese bonds, monopolised attention in foreign securities.

At the time of going to press, Antofagasta ordinary stock, for instance, has receded to 16¼ and the preference to 67d. The preference is now "ex" the latest payment in respect of preference dividend arrears, but would seem to be undervalued, even excluding the possibility that payments in respect of arrears may be accelerated.

San Paulo 10s. units have remained around 14s. 4½d., reflecting a little selling because it is feared there may be no definite settlement of the company's additional compensation claims until next year; but it is believed in the market that a reasonable settlement would mean that the 10s. units would be worth over 20s., so they may have possibilities if regarded as a long-term speculation.

Brazil Railway bonds eased to 5½. Taltal shares at 19s. 6d. have been firm again. Nitrate Railway shares were 23s. 3d. Leopoldina Terminal issues remained around the lower levels which followed the company's scheme, referred to last week. The 5 per cent. debentures were 108 and the ordinary units 10¼d. Leopoldina Railway ordinary units eased to 11⅛, and the preference to 28, and the 6½ per cent. debentures were 149¾d.

Canadian Pacifics ($69¾ at the time of going to press) remained active, and reflected the general trend in dollar stocks, recovering part of an earlier decline, though sentiment was somewhat affected by the latest traffics. Canadian Pacific 4 per cent. preference was 64½, at which there is an attractive yield, even although this stock is non-cumulative as to dividend. The 4 per cent. debentures were 80½.

Manila "A" debentures were 69 and the preference shares easier at 6s. 9d. United of Havana stocks were inactive, although the 1906 debentures attracted a little attention after their recent fall, and firmed up to 17½.

There was again little business in road transport shares, but prices were generally maintained with Southdown at 93s. 9d., West Riding 40s., and Lancashire Transport 50s. 6d. East Kent marked 80s. 6d. and Aldershot and District 79s. Elsewhere, B.E.T. deferred stock at £395 recovered part of an earlier decline.

Considerations of the yield brought in buyers for engineering shares. Guest Keen, which yield over 5⅛ per cent., were 50s. 4½d., Vickers, which yield 5½ per cent., were active around 45s., and in other directions Sheepbridge Engineering rose to 58s. 3d. on the share bonus proposals. Ruston & Hornsby were 32s. 6d., at which the yield is nearly 5½ per cent. John Brown were 46s. 4½d., Cammell Laird 5s. shares 12s., and T. W. Ward 70s. 6d.

A point attracting attention in the market is that when steel is denationalised companies presumably will have an opportunity to buy back their nationalised assets. This might mean that they would have to raise additional capital because in most cases compensation received for nationalised assets has been used to acquire new interests.

Shares of locomotive builders and engineers were fairly steady, with Beyer Peacock at 31s. 3d., at which there is a yield of over 6½ per cent. Hurst Nelson were 55s. 6d., North British Locomotive 16s. 3d. and Birmingham Carriage 33s. 6d., Vulcan Foundry 22s., North British Locomotive 16s. 1½d., Gloucester Wagon 13s. 3d., Wagon Repairs 10s. 6d., and Charles Roberts 20s. 6d.

Traffic Table of Overseas and Foreign Railways

	Railway	Miles open	Week ended	Traffics for week: Total this year	Traffics for week: Inc. or dec. compared with 1949/50	No. of week	Aggregate traffics to date: Total 1950/51	Aggregate traffics to date: Increase or decrease
South & Cen. America	Antofagasta ...	811	25.1.52	£ 151,600	+ 49,460	4	£ 525,600	+ £ 130,070
	Costa Rica ...	281	Dec., 1951	c1,313,267	+ c429,807	26	c7,260,673	+ c1,079,944
	Dorada	70	Nov., 1951	33,765	— 3,207	48	394,882	— 33,323
	Inter. Ctl. Amer. ...	794	Nov., 1951	$1,039,455	— $19,932	48	$11,978,007	— $282,812
	Paraguay Cent. ...	274	28.12.51	G289,547	+ G102,688	26	G8,823,911	+ G3,556,978
	Peru Corp. ...	1,050	Dec., 1951	$8,471,000	+ $1,124,000	26	$49,271,000	+ $3,141,000
	" (Bolivian Section)	66	Dec., 1951	Bs.19,282,000	+ Bs.5,954,000	26	Bs.95,087,000	+ Bs.25,173,000
	Salvador	100	Nov., 1951	c140,000	— c28,000	22	c635,000	+ c112,000
	Taltal	147	Dec., 1951	$2,157,000	+ $721,900	26	$12,277,000	+ $3,020,200
Canada	Canadian National†	23,473	Nov., 1951	18,035,000	+ 403,000	48	190,178,000	+ 22,295,000
	Canadian Pacific† ...	17,037	Dec., 1951	11,865,000	+ 591,000	52	142,771,000	+ 16,779,000
Various	Barsi Light* ...	167	Dec., 1951	27,217	+ 3,165	38	308,767	+ 51,832
	Egyptian Delta ...	607	10.4.51	17,513	— 267	4	17,513	— 267
	Gold Coast ...	536	Nov., 1951	347,307	+ 38,503	34	2,095,480	+ 135,872
	Mid. of W. Australia	277	Nov., 1951	62,093	+ 22,023	22	304,756	+ 111,372
	South Africa ...	13,398	5.1.52	1,651,726	+ 120,221	40	76,285,611	+ 7,998,012
	Victoria	4,744	Oct., 1951	2,172,730	+ 1,149,080	17	—	—

* Receipts are calculated at 1s. 6d. to the rupee † Calculated at $3 to £1